December 21, 1942

# STEEL

PUBLIC LIBRARY
DETROIT

PRODUCTION • PROCESSING • DISTRIBUTION • USE
ESTABLISHED 1882

SPECIAL FINISHES

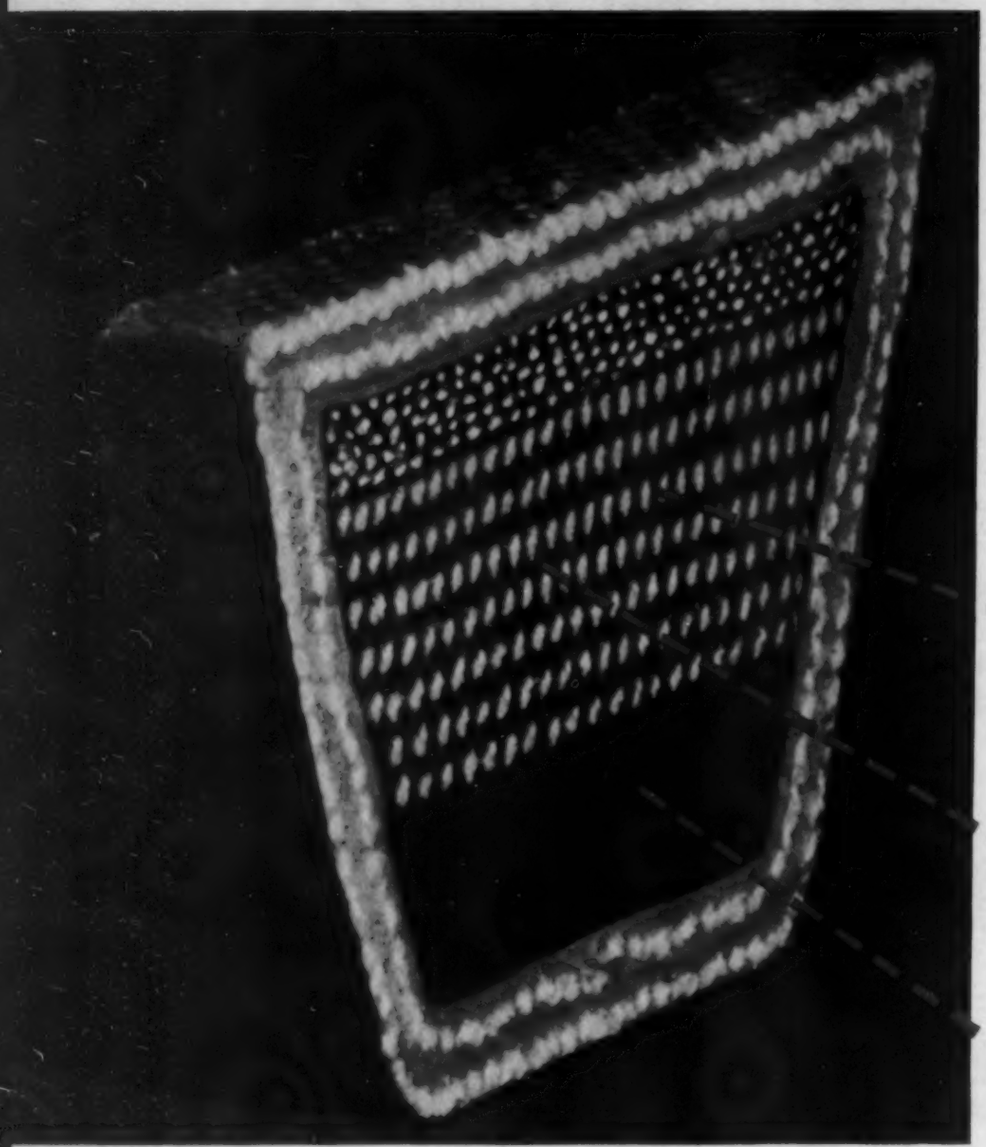
THOMAS COLD ROLLED STRIP STEEL SOLVES
MANY WAR PRODUCTION PROBLEMS—

Thomas Strip
COLD ROLLED STRIP STEEL

BRIGHT FINISH NOT COATED
SOLDER COATED ELECTRO
COATED WITH NICKEL OR
ZINC COPPER BRASS

THE THOMAS STEEL CO. — WARREN, OHIO

# Here's a Slice of LONGER V-BELT Life!



It's the section of a new Texrope Super-7 . . . and the new ways Longer Life is Built right into it Point to ways *You* can make Your V-belts last Longer.. whatever Brand you Use!

*V-Day needs every V-Belt*

**50% STRONGER CORDS** produced by the new Flexon process combat stretching. **YOU** can fight stretching—and the slip and burning that result — by promptly taking up any slack that may develop. Remember, many V-belts are now working four times as many hours a week as in peacetime, may need inspection *four times as often!*

★

**20% MORE CORDS** than before help protect the new Texrope Super-7 against strains and breaks. **YOU** can minimize breaks in your plant — whatever make of V-belts you use — by requiring that V-belts *never* be pried into grooves. For V-belts, prying is a back-breaking operation!

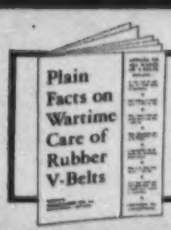
★

**COOLER-RUNNING CUSHION** of special rubber "eases" cords around sheaves—for smoother flexing and less heat. **YOU** can fight heat by preventing misalignment. It causes rubbing of belt sides, extra heat and shorter V-belt life. So keep sheave grooves in line—shafts parallel.

★

**WHEN YOU DO NEED** new V-belts, *invest in the best* — Texrope Super-7!

A 1543




**FREE!** Every engineer should have this valuable new handbook in his technical library.

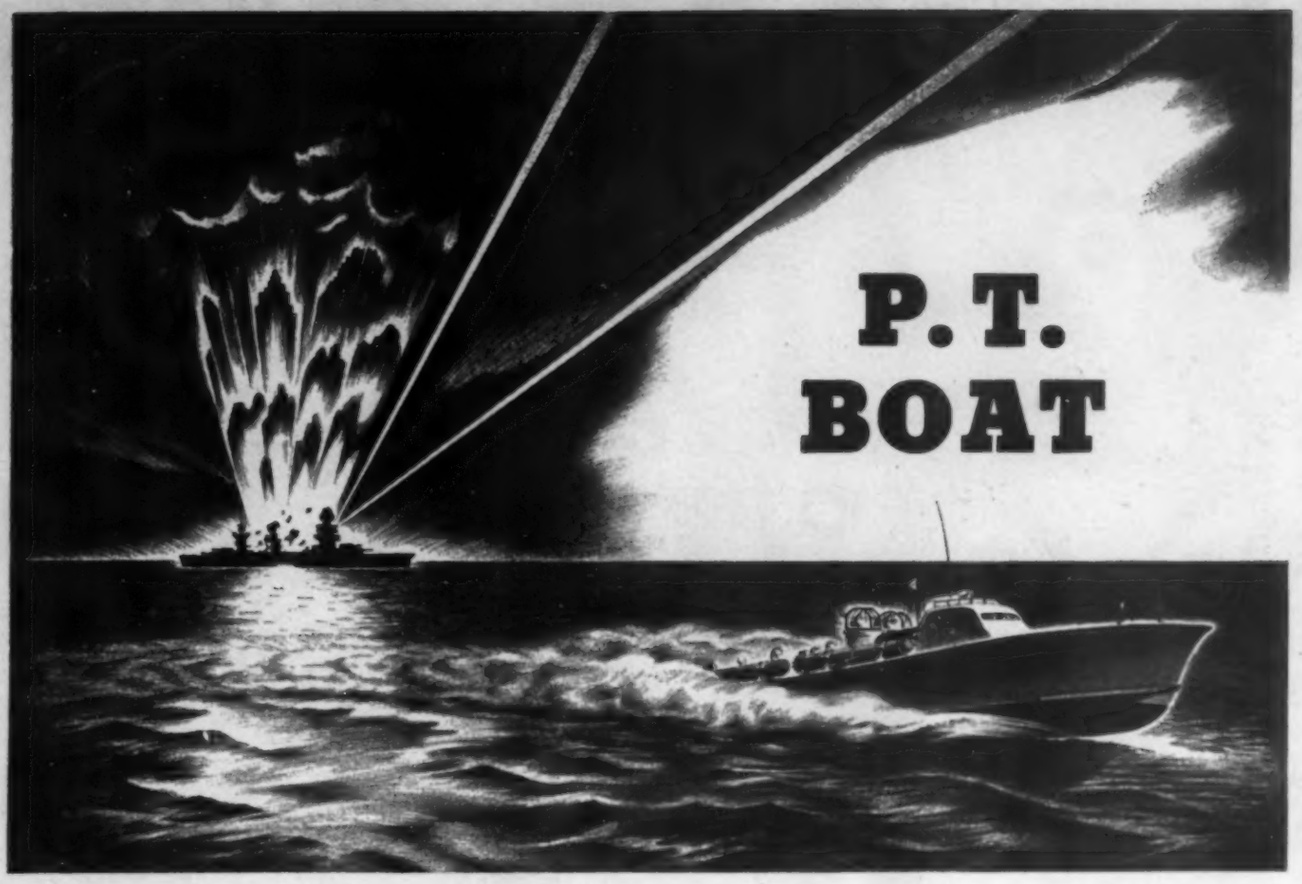
It applies to *all* makes of V-Belts—contains no advertising. Write Allis-Chalmers for it *now!*

# ALLIS-CHALMERS

WE WORK FOR VICTORY — WE PLAN FOR PEACE

## TEXROPE* SUPER-7 V-BELTS

*Trade mark registered U. S. Patent Office. Texrope Super-7 V-Belts are the result of the cooperative research and design genius of two great companies — Allis-Chalmers and B. F. Goodrich — and are sold exclusively by Allis-Chalmers. Available in all sizes..... h.p. to 3,000 h.p.



# P.T. BOAT

With motors throttled to a mutter, the little boat slips cautiously toward the long shadow that looms against the stars.

Suddenly, aboard the warship, a siren screams, searchlights probe frantically over the waters . . . too late. The P.T. boat leaps in, launches its torpedo, and roars off at a tangent as a geyser of blinding flame towers upward into the night.

Powered and gunned by the automotive industry, handled by a tiny crew of daring men, these little P.T. boats pack a tremendous punch. They can deal a blow to destroy the biggest ship afloat.

Bethlehem is turning out steel for the P.T.'s marine engines, for their guns and shells, for the torpedoes they carry—as well as for the thousand and one other types of war production in which the changed-over automotive industry is hard at work.

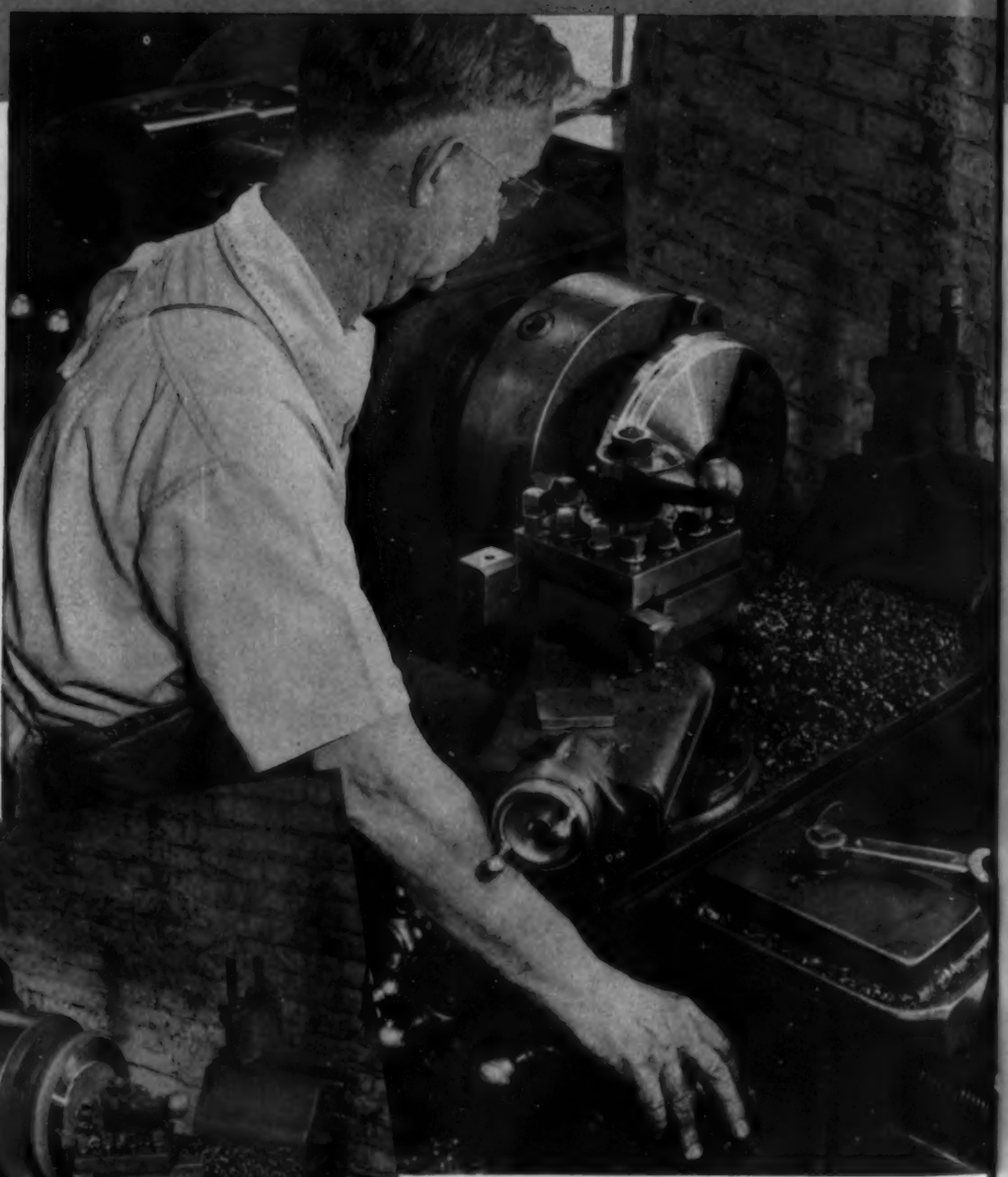
Bethlehem structural steel has put a roof over a substantial part of the industry's war production; Bethlehem tool steel is busily engaged in cutting, boring and forging on assembly lines; Bethlehem plates, sheets, bars, and forgings are going into tanks, jeeps, peeps, trucks, guns and other war products now being made by the men who used to build automobiles.

Until the world struggle is won, we of Bethlehem will continue to supply the automotive war-production machine with the best steel and the most steel we can make. Our motto: "Nothing short of too much is enough."

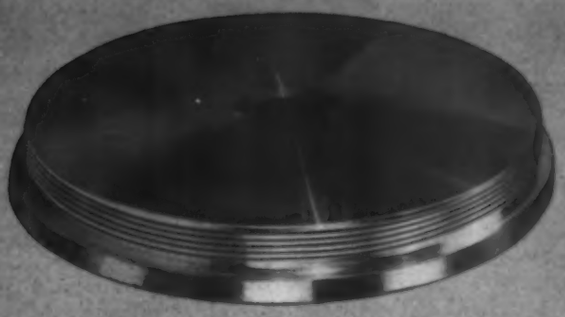
**BETHLEHEM STEEL COMPANY**

BETHLEHEM STEEL

# If you have a job like this—



# turn it on a Monarch!



Bombardiers don't care how bombs are made, just so we keep their racks full, ready to drop on the enemy.

That's why this manufacturer of base plugs put to work the Monarch lathes he already had, rather than wait for new machines that might be better fitted to the job.

First, the hub of the plug is turned on an older Monarch. Then, chucking on this hub with a 3-jaw chuck, and using the square turret with multiple positive carriage stops and clips on the cross-feed dial, our customer performs the following operations in one setup, on Monarch 18″ Model BB lathes, as illustrated:

1. Face
2. Countersink hole
3. Turn O. D.
4. Turn shoulder
5. Neck
6. Chamfer back edge
7. Rough thread
8. Finish thread
9. Chamfer thread

Actual machining time—5 Min., 25 Sec.

The material is 1035 heat-treated steel, with a tensile strength of 70,000 pounds. A tungsten-carbide tool chases threads to finished accuracy. Production is on schedule—thus good old Yankee ingenuity keeps turning out Victory implements, faster for fighters.

If you have a War production job you think might be done on a lathe, and don't quite know how to set it up, our field engineers will gladly help you.

THE MONARCH MACHINE TOOL COMPANY
SIDNEY, OHIO

MONARCH LATHES

COVER THE TURNING FIELD

# BEHIND THE SCENES

## Hit Song

■ From Carl W. Maedje, Lamp Department, General Electric Co. comes season's greetings a copy of his "PRAISE the LORD and PASS the 'LUMINATION", to be sung to the tune of the currently popular war song of nearly the same title, and with due apologies to composer Frank Loesser. Y'all set?

Down went production—a bottleneck its fate.
Down went production—too little and too late.
Up jumped the sight-pilot — he made a lighting check
And manned a turret lathe as he bombed a bottleneck . . . shouting:
Praise the Lord, and pass the 'lumination!
Praise the Lord, and pass the 'lumination!
Praise the Lord, and pass the 'lumination—So we all can see.
Praise the Lord, and raise the lighting ration.
Can't afford to grope at each location.
Praise the Lord, we're all between damnation
And the deep blue sea.
The light pilot said it. You gotta give him credit.
For a son of a gun of a bomber is he . . . shouting:
Praise the Lord. His light's our inspiration.
All aboard. Let's have no hesitation.
Praise the Lord. And pass the 'lumination.
And we'll all be free.

## "Important Audience"

■ An interesting commentary indicating how STEEL is getting read and used these days comes from Gerald E. Stedman who handled the excellent article in the November 23 issue on the General Motors method of making templates. Mr. Stedman reports that the photographic section of G-M, headed by Philip Filmer, has had a number of calls and much correspondence, including several long distance calls from both coasts. "You have undoubtedly an important audience in the aviation field", says Mr. Stedman.

## City of Steel

■ Above and below ground, from the tip of the Empire State building to the deepest subway level, more steel rests on Manhattan island than any 14,240 acres in the world. Total tonnage on the island, 12½ miles long and 2½ miles at extreme width, has never been accurately computed, but it runs into millions of tons, structural steel leading, with an amazing miscellaneous amount underground.

Wrecking and rebuilding on Gotham has been the backbone of the structural steel industry for many years, but the extent of war restrictions on private construction is clearly shown by the filing of but one building plan in Manhattan for November, a minor storage warehouse costing but $10,000. This is the lowest point ever reached since the building department was established in 1898.

## Size Please?

■ We always thought that macaroni was macaroni until we read the other day that 25 different sizes had been recently discontinued in the interest of simplification and standardization. The dies or molds, usually made of brass or stainless steel, for the abandoned sizes were turned in for the scrap drive.

And what seems even more fabulous is the fact that with 25 sizes off the market there are still some 75 sizes to choose from!

## "A. J."

■ A. J. Hain, whom you see "in action" over in the right column, was brought up in the newspaper field as reporter and editor and it is he who handles the flood of news and market reports which are digested and interpreted in these pages each week. "A.J." has been with STEEL since 1918, managing editor since 1936.

## Signs of the Times

■ Steve Lasher, our central-western circulation representative, stopped by to see the purchasing agent of the General Motors Truck division up in Pontiac the other day and found himself reading a big framed sign back of the p. a.'s desk:

**Please don't stare at our buyer, you may be nuts yourself someday.**

## THE EDITORS' *Roundtable*

*"A. J." Hain, Managing Editor*

■ You don't use words when you are asleep, but when you are awake and active you use a great many. Similarly, when the business world's pulse is slow, relatively few words are necessary to record its heart beats. But when the nation swings into war, words pour out in torrents from all business and political capitals. Washington showers us with words, both written and spoken, both on the record and off the record. Use of words reaches a new peak.

Sitting at this desk in normal times one may sense the ebb and flow of business merely by the VOLUME business needs to express itself. When business improved after the depression there was evidence of it immediately in the form of releases, literature, reports, rumors, and stories. The daily mail increased in proportion to the business cycle and now is at an all-time high.

You never were more alert to, or affected so much by words as you are today. And at the same time you probably never were more pressed for time in which to read them, listen to them, digest them and act on them. Certainly one of the most important functions of the business press is the selective economy of words to keep you well informed in a minimum amount of time.

That is the spirit prevailing in the composition of STEEL. Each week's mountain of words is sifted and sorted, condensed and correlated to give you the maximum amount of information in the shortest possible time. The reader will get an idea of what this condensation means when he considers that each week the editors of STEEL "squeeze out" enough material and extra verbiage to produce another complete magazine the size of STEEL.

Vol. 111, No. 25, December 21, 1942, issue of STEEL, published every Monday at Cleveland, O. Entered as second class matter at the post office, Cleveland, O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6; 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00.

Editorial Contents—Page 29

# Maybe the Basic Engineer Can Help

When furnace delay time seems high . . .

When refractory costs get out of line . . .

When you have excessive bottom trouble . . .

That's the time to call in the *Basic Engineer.*

You know this man, of course—may call him by his first name. His job is to be your helper—your refractories service man.

Every *Basic Engineer* is a practical steel man, with years of experience in steel making. He knows refractories—knows how they will stand up under the varying conditions met in an open hearth or electric furnace.

Especially now, he is prepared to help deal with emergency refractory problems likely to arise from continued operation of your furnaces at near capacity levels. He will supervise and assist with the installation of new hearths, or major repairs, or special applications. You may want his suggestions on hearth maintenance.

If you are to deliver maximum production from your furnaces in 1943, you can't afford to take chances on refractories. So call in the *Basic Engineer.* Give him your refractory jobs to do.

**BASIC REFRACTORIES, INCORPORATED**

845 HANNA BUILDING ● CLEVELAND, OHIO

*Magnefer • Syndolag • Ramix • Hearth Patch*
*Basifrit • 695 Plastic • Gunmix • Raw Dolomite*

CHANGING FROM THIS TO THIS

Boosted Production 15%
Cut Wheel Costs 50%

*Foreman:* "They asked me if the grinding department could possibly turn out more of certain parts with present equipment. I began experimenting. I changed the wheel combination from the old standard and it worked! We cut down grinding wheel costs and got more pieces per hour. So if you can't get more grinding machines, try some wheel experiments. Try telephoning a Norton engineer for a tip."

★ ★ ★ NORTON ABRASIVES

NORTON COMPANY, WORCESTER, MASS.
BEHR-MANNING DIVISION, TROY, N. Y.

# BLASTING

## PRODUCTION JAMS
## is our specialty

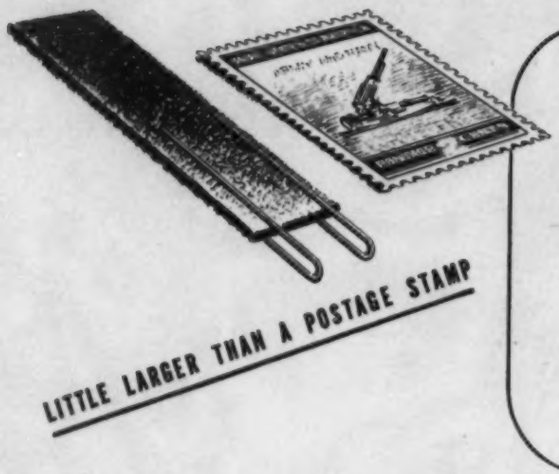
DAY BY DAY, production problems get tougher. Yet a way to solve them must be found . . . and quickly. That's where Shell men come in.

They think in terms of new ideas . . . ideas to make Shell Lata Cutting Oils produce better work, faster. What's more, they know how to combine these ideas with the practical knowledge gained through working with scores of plants on their cutting oil problems. As a result Shell has developed a control technique that "balances" the oil to the specific job at hand . . . fits the oil to the machine, the application and the tool.

*Call in the Shell man now. Let him show you how this technique can cut machine down-time, improve surface finish, increase tool life in* your plant.

**SHELL LATA OILS** *for Cutting*

# A Revolutionary Method of determining Stress Distribution



LITTLE LARGER THAN A POSTAGE STAMP

## SR-4 STRAIN GAGE

SR-4 Strain Gages are the simplest gages ever built to make stress-strain distribution tests in indeterminate structures. Little larger than a postage stamp—and just as easy to affix—the SR-4's principal applications are in airplanes, railroad equipment, bridges, dams, moving parts in machinery—yet it is readily adaptable to a wide variety of other structures and equipment.

Used in conjunction with Baldwin Southwark indicating and recording equipment, SR-4 Strain Gages are particularly suited for determining stress distribution in machinery operating at high loads. They are also used extensively in airplane manufacture for flight tests and for static tests of the complete plane.

Commercial applications have been made which demonstrate the successful application of SR-4 Strain Gages for recording static and dynamic stresses in tension, torsion, compression, flexing, and impact. Stresses in gun barrels during firing, impact forces produced by a projectile, and high velocity fluid pressure changes are other applications of the SR-4. It has also been used on power and torque meters and on variable resistance rheostats without sliding contacts.

Write today to Dept. 1028 for the new SR-4 Strain Gage Application Booklet No. 171 which features the six standard gage types now available.

BLW THE BALDWIN GROUP **BALDWIN SOUTHWARK**

*Division* **THE BALDWIN LOCOMOTIVE WORKS,** *Philadelphia, Pa.*

# *Wartime Finishes Must Be* TOUGH

# JETAL

## —THE HARDEST AND MOST PENETRATING BLACK OXIDE FINISH FOR IRON AND STEEL

**Outstanding for its resistance to abrasion and rust, JETAL protects more and more wartime products. As a substitute for nickel, zinc, cadmium and tin plating, it is performing a vital service.**

**JETAL's dense black . . . deep-penetrating, non-reflective, rust-resistant . . . is a part of the metal itself. It will not chip, scale or peel . . . does not change dimensions or surface textures. Applied by simple immersion, JETAL requires no elaborate equipment, no electric current. It is the original, patented black oxide process, unexcelled in durability, speed and economy.**

### — TOUGHEST BY TEST —

***Comparative abrasion tests conducted under identical conditions, using a modern testing machine, prove JETAL's amazing wear-resistance. These tests prove that JETAL has at least 50% more abrasion resistance than its nearest competitor—as much as 230% by changes in procedure. Reports of these tests are available upon request.***

### IMMEDIATE DELIVERY ANY QUANTITY

**Ask our research staff to help you with your protective-coating problems. Consultation service without obligation. Samples JETALized without charge.**

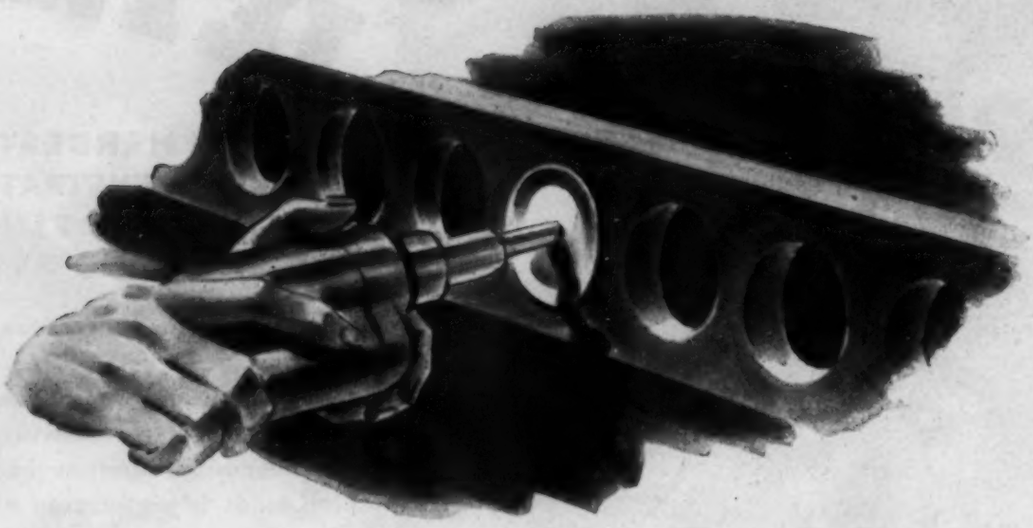
the JETAL process
Patented

## ALROSE CHEMICAL COMPANY

Providence, R. I. Tel. Williams 3000

# SLOTTED ABRASIVE DISC SPEEDS BURRING OF HOLES

## Grinds top and bottom edges of holes to true radius — all in one operation



THE job of removing the burr and producing the true radius required on all holes in aircraft engines has been greatly simplified by the introduction of the slotted abrasive disc. Made of Aloxite Brand Electrocoated Aluminum Oxide Metal Cloth, these discs are being widely used for burring and polishing all metal hole edges, from $\frac{3}{8}$" to $5\frac{1}{2}$" in diameter.

The speedy performance of the disc is a result of the flexibility achieved by its slotted design. Using a disc proportionately larger than the diameter of the hole, mounted on a spindle for use in a portable electric or air-driven tool, the operator presses it against the edge of the hole, as in the diagram below. Accommodating itself to the opening, the disc "cones" backward, sanding only the edge of the hole, leaving the flat surface untouched.

If both ends of the holes are to be finished, two discs mounted back to back are used. They are first pushed through and then pulled back against the opposite edge of the hole.

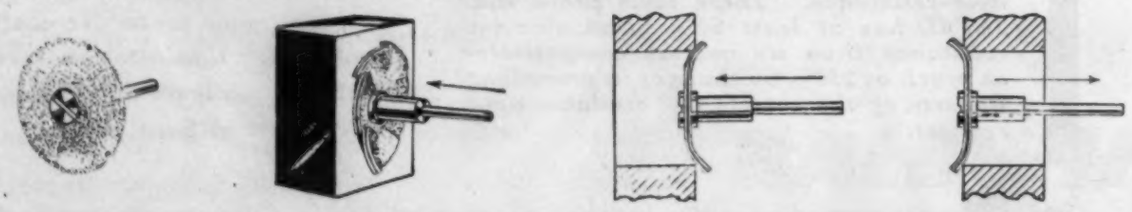
Uses for this new abrasive "Weapon for Production" are many and varied. Such parts as valve rocker arms, connecting-rods, tappet guides, oil holes etc., having openings larger than $\frac{1}{16}$", are typical of its wide application.

In ordering slotted abrasive discs, it is important to select the correct grit for the kind of metal employed and the finish required.

If you care to try a few of these slotted discs we will be glad to send them free of charge. Simply address your request to Dept. S, The Carborundum Company, Niagara Falls, N. Y.

CARBORUNDUM
REG. U. S. PAT. OFF.
ABRASIVE PRODUCTS

### DIAGRAMS SHOW HOW SLOTTED DISC WORKS



**THE CARBORUNDUM COMPANY, NIAGARA FALLS, N. Y.**

Sales Offices and Warehouses in New York, Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh, Cincinnati, Grand Rapids

(Carborundum and Aloxite are registered trade-marks of and indicate manufacture by The Carborundum Company)

*O W I Photo by Palmer*

# ALLOY AMMUNITION DUMP

## FOR THE WAR MATÈRIEL BUILDERS

COILS of strip and stacks of sheet bars—Allegheny Ludlum Stainless and Electrical steels—how well the United Nations will make use of these vital alloys—and how well Hitler and the Axis would like to have similar stockpiles in as great amount as the United States enjoys.

As illustrated, these alloy steels are in the hot-rolled state. They're still a raw material. A great deal of careful and often highly involved processing—hot and cold-working, annealing, pickling and surface-finishing—must be done before they'll be ready to take their places on the war lines. But one day soon—correct to the exact physical, chemical or electrical properties required of them—these alloy steels will take their places in the planes, tanks, guns and ships of the fighting fronts. And always, it is a most essential and important place.

High-alloy steels are not ordinary materials. They are not produced, nor can they be used, in ordinary fashion. Above all, they must not be wasted through faulty selection, undue scrap losses, too high a percentage of rejects and spoilage, or any other reason that would prevent a fabricator from getting the maximum amount of war matèriel from every ton of alloy steels he uses.

That's both your and our responsibility, and we want to help in any way possible. Complete technical and fabricating data is available on all Allegheny Ludlum grades, and if you need it, the personal assistance of our Technical Staff as well.

**Allegheny Ludlum**
**STEEL CORPORATION**
PITTSBURGH, PENNSYLVANIA

A-8729 . . . W & D

# ...and you'll see *Real* metal cutting action!

WHEN you want fast precision metal cutting in production, tool room or general maintenance work — put a Wells on the job. You'll have a saw that handles many shapes and types of metal with unusual smoothness and accuracy.

The Wells Series 80, above, is the latest model of the popular Wells No. 8. It has all the advantages that Wells have built into their products through years of leadership in band saw manufacture. It is a rugged, versatile unit, capable of cutting up to 8" rounds or 8" x 16" rectangles. You will find it one of the handiest tools in a plant. You can get one quickly tool Phone your distributor or write us.

**WELLS V-12**

Capacity is 13" rounds; 13" x 16" rectangles.

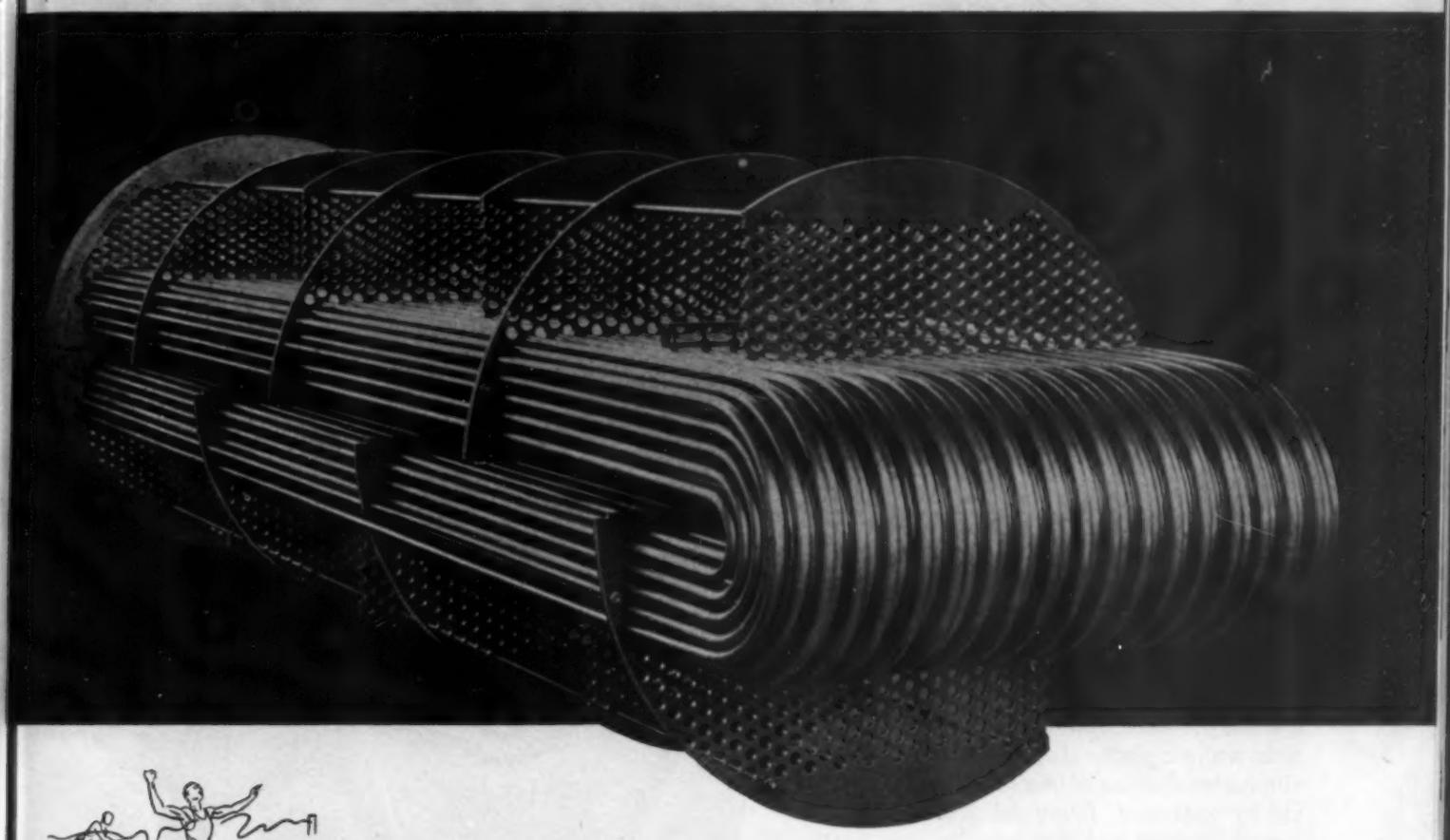
*Wells Has Established Leadership*

WELLS MANUFACTURING CORPORATION

Wells **METAL CUTTING BAND SAWS**

1515 FILLMORE STREET • THREE RIVERS, MICHIGAN

# Here's that EXTRA Surge of *Speed* You Need in Tube Installation



When the "heat is on" for faster tube installation, think of ELECTRUNITE. These tubes have the qualities that speed up fabrication of new heat exchangers, condensers and evaporators —that cut "down time" when retubing old ones.

ELECTRUNITE Condenser and Heat Exchanger Tubes are *CONSISTENTLY* uniform in diameter, wall thickness and concentricity. They're uniformly ductile—free from hard spots. They slide freely through holes in tube sheets. Under pressure of the expanding tool, they roll in *EVENLY* and *QUICKLY* to tight, non-leaking joints. They weld easily and uniformly, too. They bend to desired shapes with minimum distortion.

ELECTRUNITE Tubes possess all these "hurry-up" abilities plus a smooth, scale-free and pit-free surface—because they're made from flat-rolled steel and electric resistance welded. Strength is assured by hydrostatic testing at pressures within 20% of the minimum yield point of the steel.

That next tubing or retubing job of yours can move faster—if you use ELECTRUNITE Tubes. They're made in carbon steel in sizes from ⅜″ to 5″ O.D.—in Enduro* Stainless Steel in sizes from ⅛″ to 3″ O.D.

**STEEL AND TUBES DIVISION**
**REPUBLIC STEEL CORPORATION**
**CLEVELAND • OHIO**

Berger Manufacturing Division • Niles Steel Products Division
Union Drawn Steel Division • Culvert Division • Truscon Steel Company
Export Department: Chrysler Building, New York, New York

*Reg. U. S. Pat. Off.

*Republic*

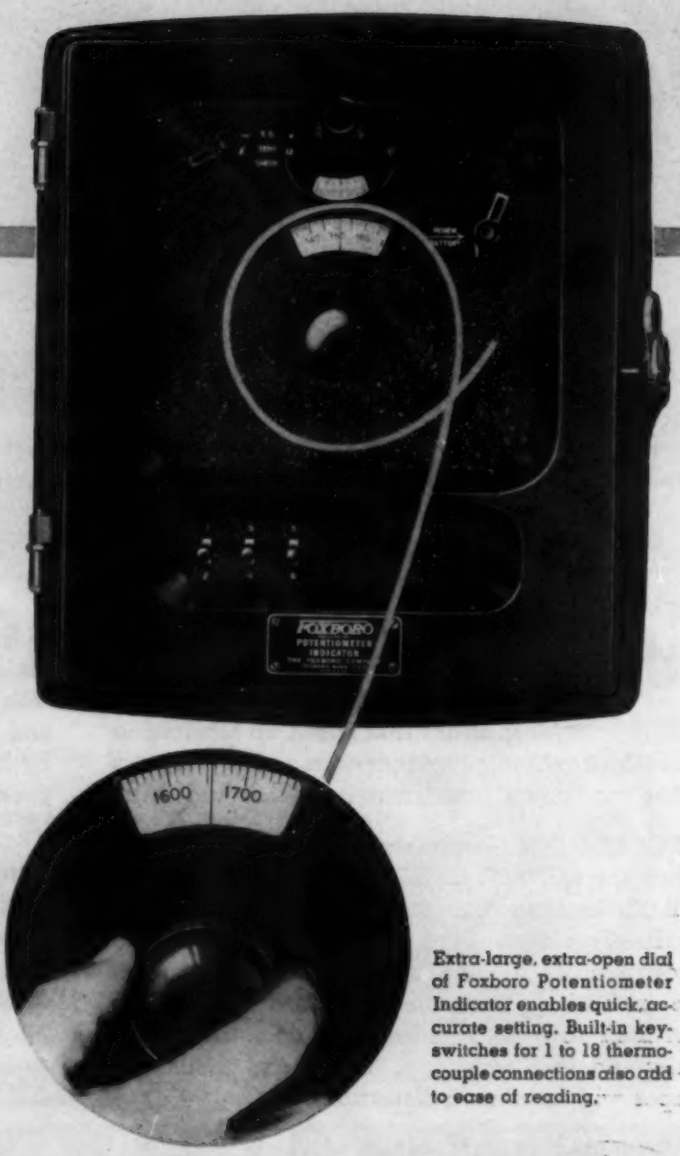
# ELECTRUNITE

Reg. U. S. Pat. Off.

**ELECTRIC RESISTANCE WELDED BOILER, CONDENSER AND HEAT EXCHANGER TUBES**

# *On-the-Job Precision* that approaches Laboratory Standards!

**AN INDICATING PYROMETER THAT GIVES UNUSUAL ACCURACY IN THE PLANT**




Here's a practical solution to wartime production problems of getting high-accuracy temperature information under today's speeded-up shop conditions!

Foxboro Potentiometer Indicators combine thermal precision approaching laboratory standards, with simplicity of operation that practically eliminates chances of inaccurate setting or reading by operators. Every detail is specially designed for ease and accuracy!

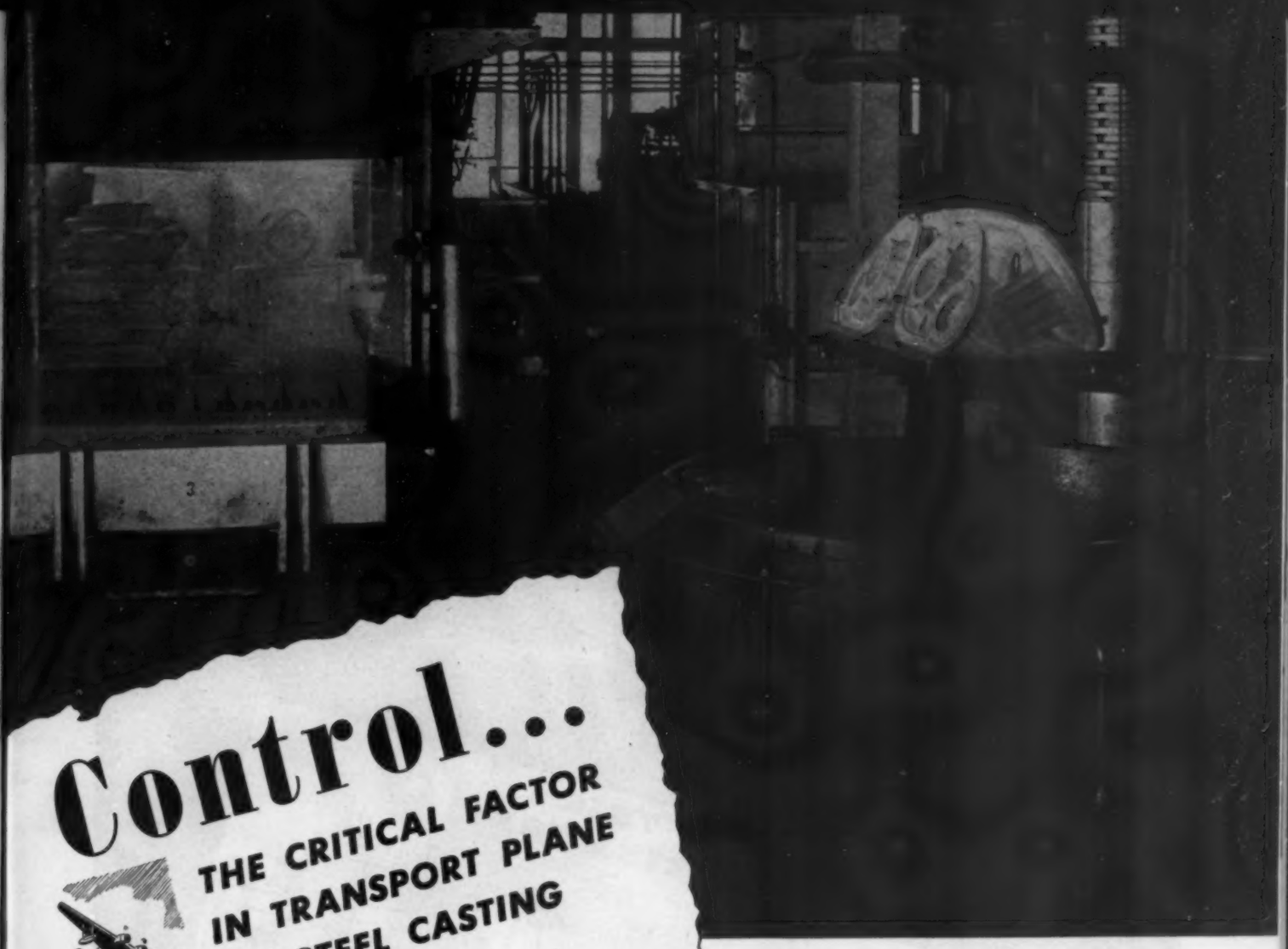
For example, the patented Foxboro Auto-Vernier Rheostat incorporates coarse and fine adjustment slide-wires in a single unit for standardizing the measuring circuit with precision. The extra-large dial provides an open, 17 inch temperature scale which can be easily read to very small units. Further, the vernier setting knob permits precision setting of the measuring slide wire.

These are merely two of the better-engineered features of Foxboro Potentiometer Indicators that give guaranteed accuracy of 1/4 of 1% of scale value . . . and permit easy reading to 1/6, or even 1/10, of 1% of scale. Write for complete details in Bulletin A-305. **The Foxboro Company, 118 Neponset Avenue, Foxboro, Mass., U. S. A.** Branch offices in principal cities of United States.

Extra-large, extra-open dial of Foxboro Potentiometer Indicator enables quick, accurate setting. Built-in key-switches for 1 to 18 thermocouple connections also add to ease of reading.

**Potentiometer Instruments by FOXBORO**

Reg. U. S. Pat. Off.



# Control...

## THE CRITICAL FACTOR IN TRANSPORT PLANE OR STEEL CASTING

WHEN the transport plane ferries its cargo of men or materiel across the skies, lives or equipment hang by delicate threads of control. For the heart of the huge freighter of the clouds lies not in the wingspread or motor, but in the instrument panel.

In this war, control plays a part it never before achieved . . . and plays it not only on battlefields and transportation routes but also on the industrial front where equipment is made.

The Lebanon Steel Foundry stresses control practices in the production of Circle Ⓛ Castings. One of the most important of these practices is heat treatment. The heat treatment of every Circle Ⓛ Casting is controlled to meet definite physical specifications.

Lebanon adapts the method of heat treatment to the size, shape and composition of the casting. Practices include normalizing . . . annealing . . . liquid quench (in water or oil) . . . and tempering. Castings just removed from the heat treating furnace and about to be oil quenched are shown in the photograph. Lebanon heat treating furnaces, of various types, are equipped with the most modern temperature controls.

Because Circle Ⓛ Castings play vital roles in American war operations, Lebanon considers it a duty to pay the premium casting soundness demands . . . control of foundry practice at every possible step. That's why Circle Ⓛ Castings are worthy to serve such foremost industrial organizations as Terry Steam Turbine and Lukens Steel.

**Lebanon metallurgists have had close contact with war production requirements since the beginning. Their experience in solving today's type of industrial problem is available to interested organizations.**

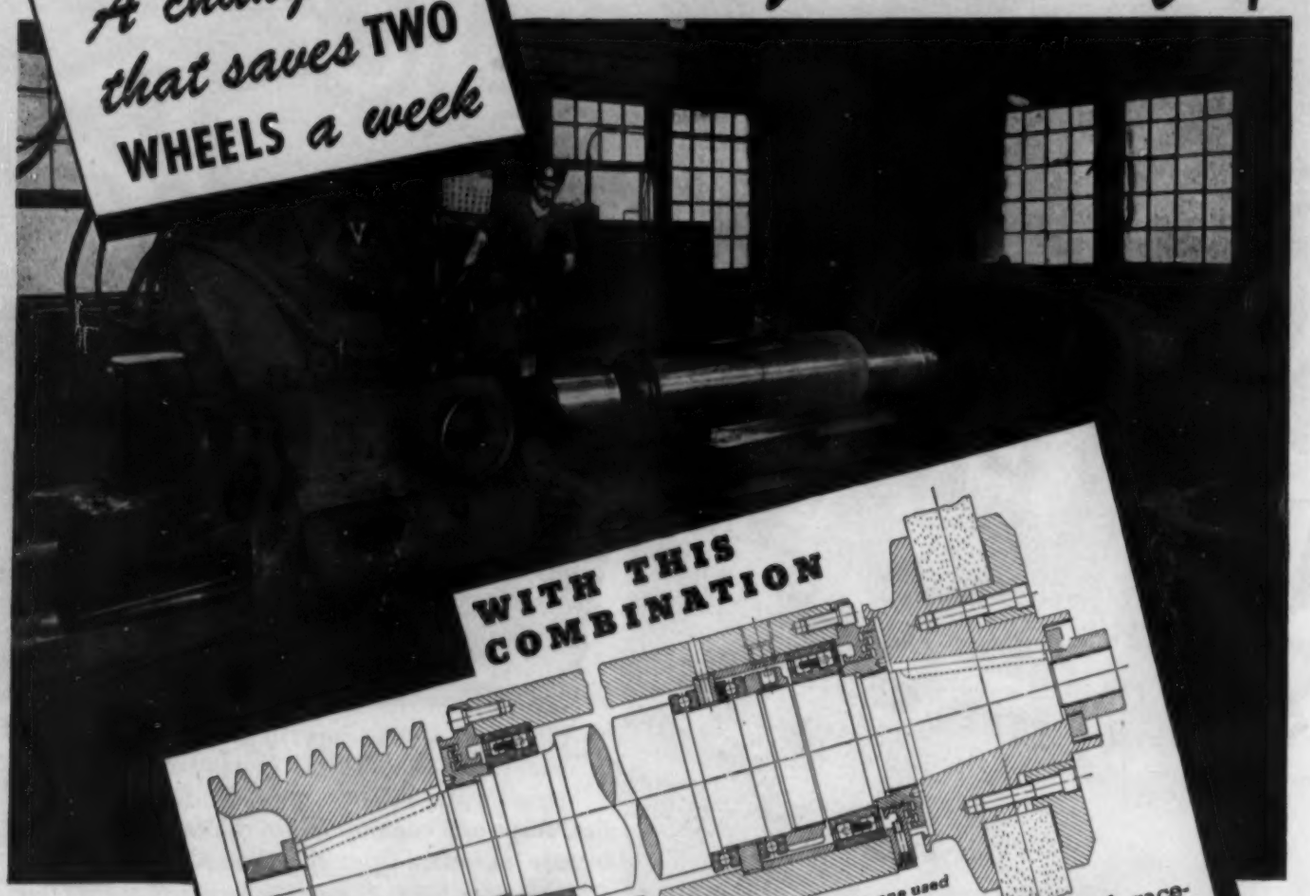
**LEBANON STEEL FOUNDRY • LEBANON, PENNA.**

ORIGINAL AMERICAN LICENSEE GEORGE FISCHER (SWISS CHAMOTTE) METHOD

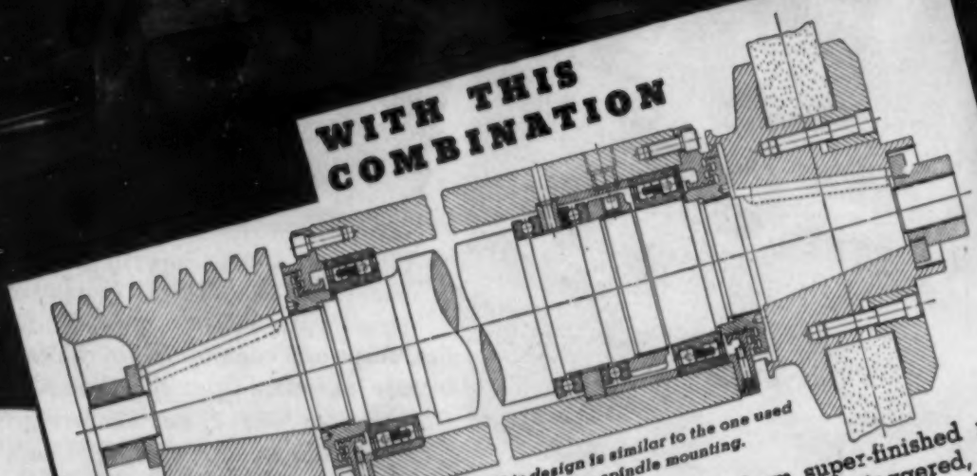
**LEBANON** *Stainless and Special Alloy* **STEEL CASTINGS**

# *Smoothness* FOR *long wheel life!*

## *A changeover that saves* TWO WHEELS *a week*



**WITH THIS COMBINATION**



*• This design is similar to the one used in the above spindle mounting.*

- **SMOOTHNESS** from super-finished raceways and a large number of staggered, ultra-precision rollers which are lapped by a special method.
- **RIGIDITY** from long surface contact of rollers.
- **CONSTANT LOW TEMPERATURE** due to low friction.

CHANGING over from a ball bearing spindle to an SKF roller bearing spindle made a BIG difference in the performance of this roll grinder. *The rigidity and smoothness of the bearings increased the ratio of steel removed to wheel wear sufficiently to save two grinding wheels per week.* Furthermore, wheels can be used down to a considerably smaller diameter than formerly. Anything that *helps* Production *hurts* the enemy of us all. 5160

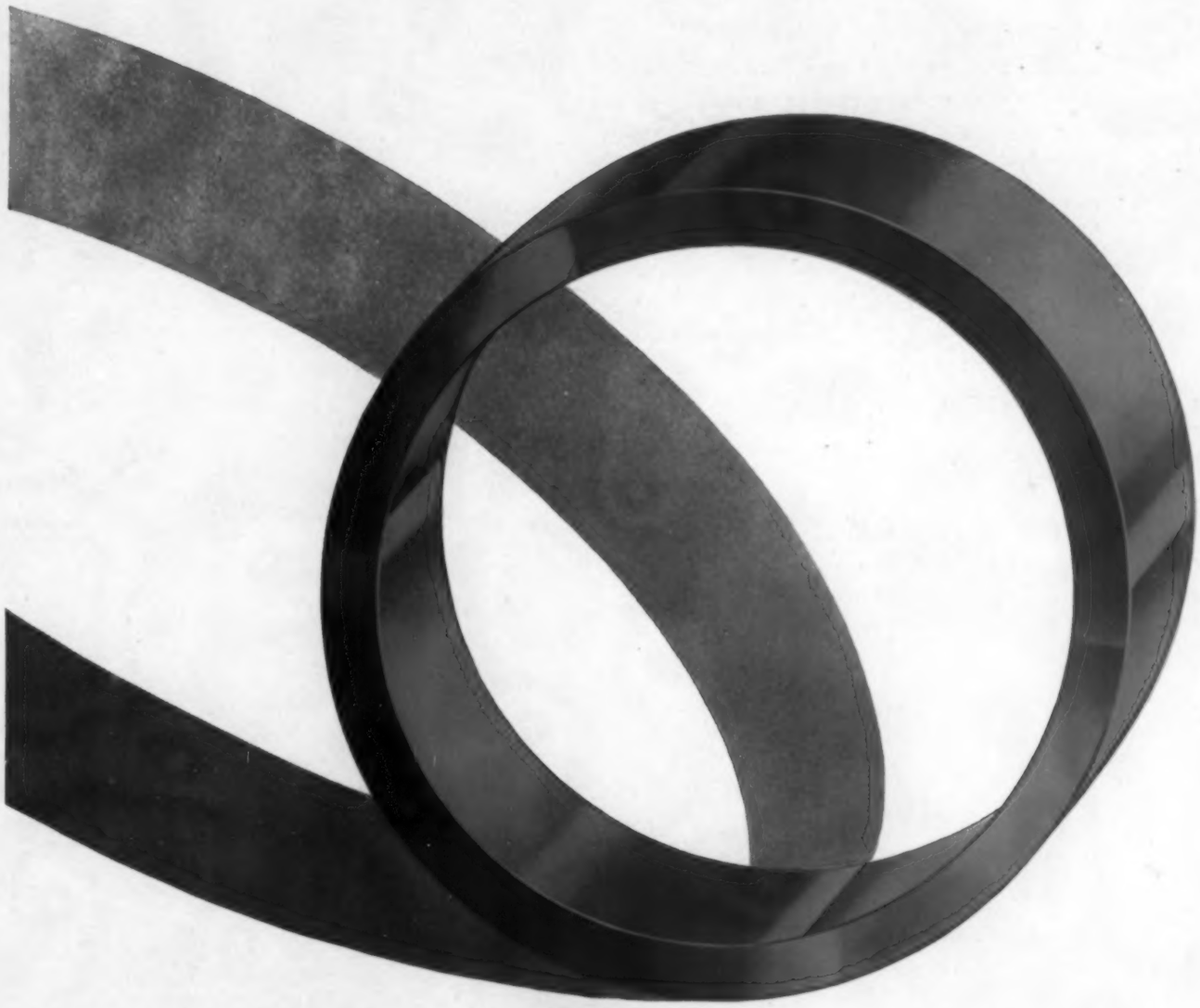
SKF INDUSTRIES, INC., PHILADELPHIA, PA.

**SKF**

BALL AND ROLLER BEARINGS

# LEWIN-MATHES
# ROTATING SHELL BANDS AND SEAMLESS TUBING
## of pure copper or gilding metal

**Our ever growing facilities enable us to meet your urgent needs.**



**LEWIN MATHES**

LEWIN-MATHES COMPANY · · SAINT LOUIS, MISSOURI

# Proper Welding Accessories and Increase Production

## Select yours from this new G-E catalog — — — describes and illustrates more than 100 items

THIS new 32-page G-E catalog is more than a mere listing of products—it is a complete, up-to-the-minute reference book on all important arc-welding accessory items. Profusely illustrated throughout, it contains a wealth of important information.

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**ARC-WELDING ACCESSORIES FOR WOMEN** is the title of another new G-E catalog which describes and illustrates a complete line of helmets and handshields, electrode holders, and protective clothing particularly suited for women. For your copy, contact your G-E arc-welding distributor or local G-E office and ask for GEA-3295, or use coupon on opposite page.

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many different types, including the popular G-E ventilated head protectors.

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specially designed to protect the eyes against flying slag particles and flashes from other arcs while the helmet is raised.

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an easily-applied liquid that prevents the adhesion of weld spatter.

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*The Navy "E", for Excellence, has been awarded to 92,780 General Electric employees in six plants manufacturing naval equipment*

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GENERAL ELECTRIC

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## . . . N-A-X *9100 Series*

Conserving strategic alloying elements without impairing quality, the use of N-A-X 9100 Series of Alloy Steels in hundreds of war applications assures the production of *more* efficient equipment for our armed forces on every battlefront.

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**NATIONAL STEEL CORPORATION**
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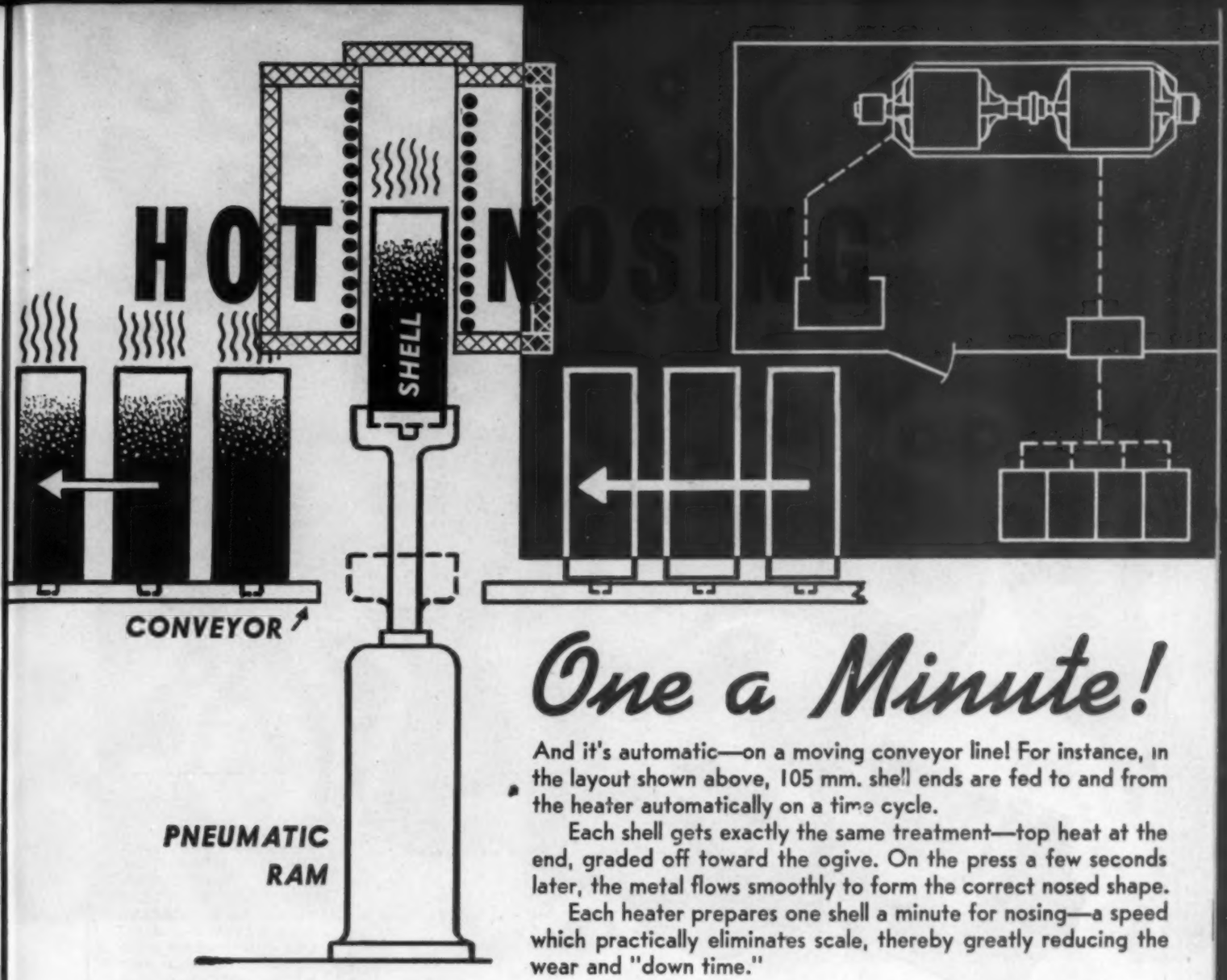
**SCRAP IS VITAL TO STEEL PRODUCTION . . . GET YOURS IN FOR VICTORY!**




# One a Minute!

And it's automatic—on a moving conveyor line! For instance, in the layout shown above, 105 mm. shell ends are fed to and from the heater automatically on a time cycle.

Each shell gets exactly the same treatment—top heat at the end, graded off toward the ogive. On the press a few seconds later, the metal flows smoothly to form the correct nosed shape.

Each heater prepares one shell a minute for nosing—a speed which practically eliminates scale, thereby greatly reducing the wear and "down time."

## AND A PEACE-TIME PARADOX...

Plants that install Ajax-Northrup High Frequency Equipment now for forging, nosing, brazing, hardening or melting will be in an enviable position after the emergency because they can convert from one process to another—produce new products in many sizes and shapes by making a few changes in the high frequency coils.

They will be able to extend the tremendous advantages of speed, quality and low cost to their buying public.

Paradoxically, Ajax equipment purchased primarily for defense production is preparing many companies for the highly competitive peace-time conditions to come.

51

# AJAX HIGH FREQUENCY FURNACES

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**ASSOCIATE COMPANIES: THE AJAX METAL CO.** *Non-Ferrous Ingot Metal for foundry use.*
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Tailored to your needs

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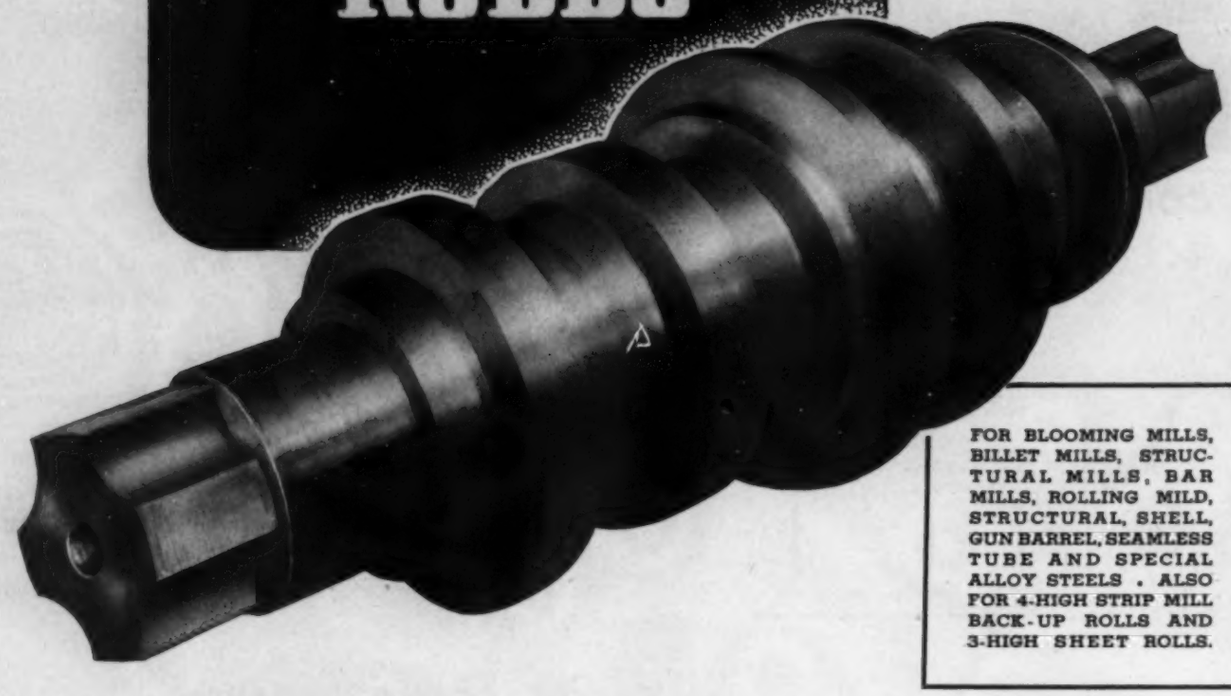

FOR BLOOMING MILLS, BILLET MILLS, STRUCTURAL MILLS, BAR MILLS, ROLLING MILD, STRUCTURAL, SHELL, GUN BARREL, SEAMLESS TUBE AND SPECIAL ALLOY STEELS . ALSO FOR 4-HIGH STRIP MILL BACK-UP ROLLS AND 3-HIGH SHEET ROLLS.

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BIRDSBORO STEEL FOUNDRY AND MACHINE CO. • Birdsboro, Pennsylvania

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# AN ASSURED RATE OF 1000 SHOTS PER MINUTE

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A JAMMED machine gun is a matter of life or death to the sky fighter. In the breathless seconds of mortal combat this belt of 30-calibre bullets must roar through his gun without a falter. On the unfailing uniformity of the links that hold the bullets together, his safety and the safety of his plane depend.

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Every pound of American Quality Cold Rolled Strip furnished for machine gun belt links, and similar high-precision parts, is bright annealed in furnaces which were especially improved by American Steel & Wire engineers.

Precise and positive automatic control of annealing time, temperature and atmosphere results in highly uniform annealing and freedom from decarburization, insuring perfect workability of the material. That's why millions of machine gun belt links are being manufactured of American Quality Cold Rolled Strip. It enables the belt link fabricator to set his dies for top-speed manufacture with full assurance of getting the precise contour required.

Our engineers will be glad to help you in solving any problems you may have in fabricating cold rolled strip steel for war products.

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*American Quality*
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STEEL SPRING WIRE · WELDING WIRE
WIRE SPRINGS

UNITED STATES STEEL

# Oil Seals · Dirt Seals · Grease Seals

## GOOD SHAFT FINISH ESSENTIAL TO EFFECTIVE LUBRICANT SEALING

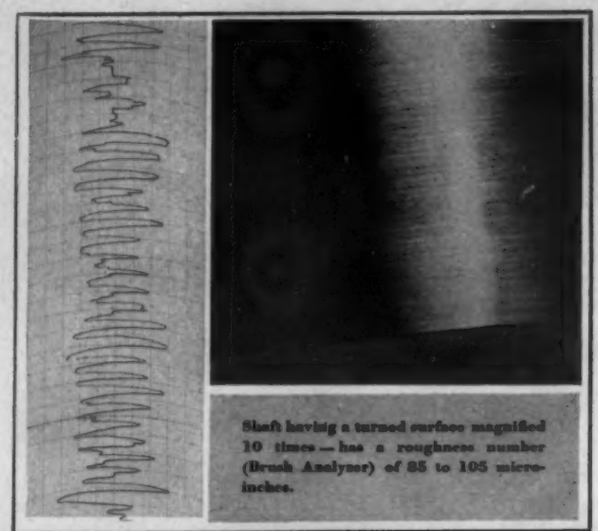
THE FOURTH IN A SERIES OF MESSAGES TO HELP THOSE ON THE INDUSTRIAL FRONT RESPONSIBLE FOR BETTER BEARING PERFORMANCE

The spring loaded wiping lip (leather or synthetic rubber) of a lubricant seal rides the surface of the shaft over which it is installed.

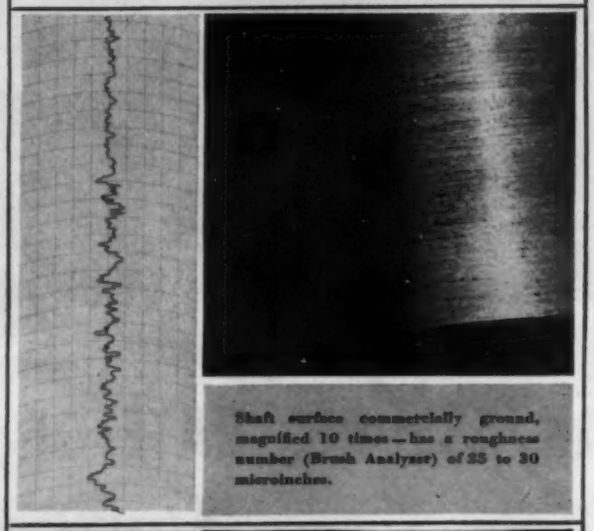
If that shaft has merely been turned on a lathe, its surface, magnified, reveals a series of spiral furrows and sharp ridges somewhat like fine screw threads. In operation these sharp ridges tend to damage the surface of the seal packing member and at the same time carry lubricant past it.

Commercial grinding improves such a turned surface by levelling off the sharp ridges but the individual grit particles of the grinding wheel also cut spiral paths in the surface of the shaft—still detrimental, only in a lesser degree.

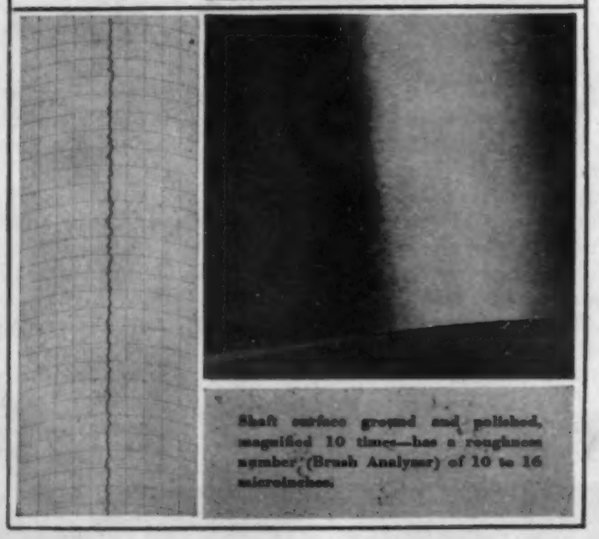
After grinding that part of the shaft under a lubricant seal, if polished with fine emery cloth to eliminate all spiraling and to produce a very smooth surface, then sealing will be most effective and the maximum service life of the seal assured.



Shaft having a turned surface magnified 10 times—has a roughness number (Brush Analyzer) of 85 to 105 microinches.



Shaft surface commercially ground, magnified 10 times—has a roughness number (Brush Analyzer) of 25 to 30 microinches.



Shaft surface ground and polished, magnified 10 times—has a roughness number (Brush Analyzer) of 10 to 16 microinches.

**CHICAGO RAWHIDE MANUFACTURING CO.**
1308 ELSTON AVENUE • CHICAGO, ILLINOIS

PHILADELPHIA • CLEVELAND • NEW YORK
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*64 Years Manufacturing Quality Mechanical Leather Goods*
*Exclusively and now Sirvene Synthetic Products*

# The Changing Face of AMERICAN INDUSTRY

IN a few swift months, America has achieved a miracle in conversion . . . from the implements of peace to the machines of war.

Great plants transformed their production almost overnight from tractors to tanks . . . autos to jeeps . . . washing machines to gun mounts . . . table knives to bayonets . . . vacuum cleaners to fire bombs . . . airliners to flying fortresses.

In changing to these new lines, each manufacturer had to meet and master scores of problems. Wherever Cold Finished Steel is involved, B&L engineers have taken over these many problems and rendered invaluable service in specifying steels, improving machine operations and recommending special heat treating or strain tempering methods.

All for steel . . . and steel for all . . . that is today's big job. Bliss and Laughlin mills are running night and day to supply their share of Cold Finished Bars for the nation's victory needs.

Help him win by purchasing war bonds and stamps. Back him 100% by meeting your quota of 10% every payday.

COLD FINISHED STEEL AND SHAFTING

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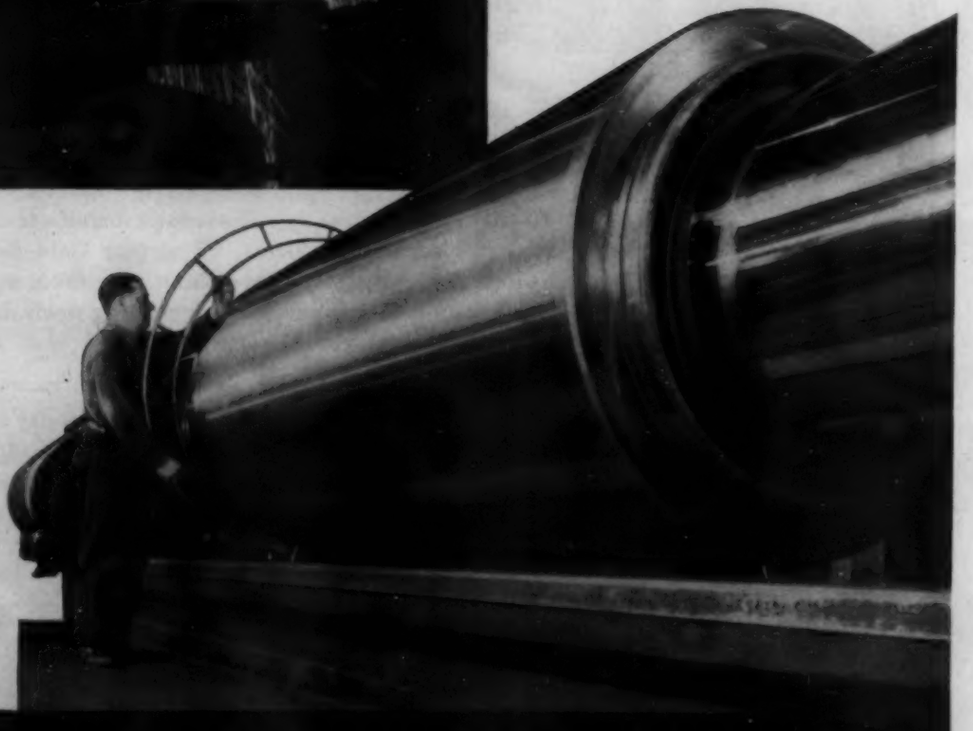
## SPECIAL ALLOY CAST STEEL

# BACKING-UP ROLLS

## FOR FOUR HIGH HOT AND COLD STRIP MILLS

The Army-Navy "E" Flag, with two stars, flies over the Mesta plant.

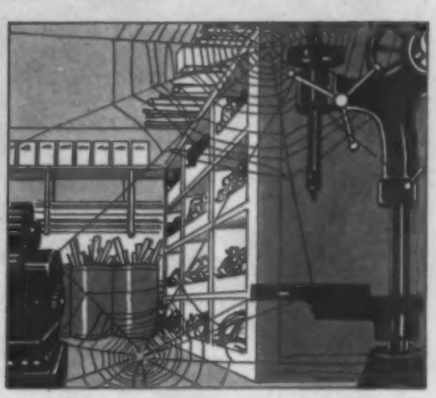


**MESTA MACHINE COMPANY · PITTSBURGH, PA.**

# Collect Your Scrap

**1.** Segregate your *regular scrap*—turnings, stampings, filings, all the metal waste produced in your plant—by its alloy co ntent. You thus insure its re-use where it is needed most—and you also get a higher price for the scrap.

**2.** Clean out your *junk*—old or obsolete machinery, pipe, pumps, shafting, dies, jigs, tools, engines, electrical apparatus—the abandoned equipment that is overlooked in routine scrap collections. All this metal can be used now.



**3.** Turn in the *cobweb scrap*—the equipment that has been gathering dust in the corner for an emergency. Outdated machinery and tools, extra fixtures, patterns, stocks, unused metal buildings—they are needed today.

**SCRAPPY SAYS:**

Yes sir, we've got to have scrap. It takes scrap to make steel. And it takes lots of steel to win a war. If you aren't already regularly selling your scrap,

**HERE'S WHAT TO DO:**

Call your junk man . . . or send it to the collection station for the Local Salvage Committee . . .

or give it to the Boy and Girl Scouts or other Civic Collection Agencies.

Your scrap will be removed promptly and speeded on its way to steel mills for re-use. The faster your plant contributes its unused or waste metal, the sooner that metal can be put to work again—in guns, tanks, and planes.

For further information, get in touch with your local WPB office, or write to the Bureau of Industrial Conservation, War Production Board, Washington, D. C.

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*Unit of Union Carbide and Carbon Corporation*

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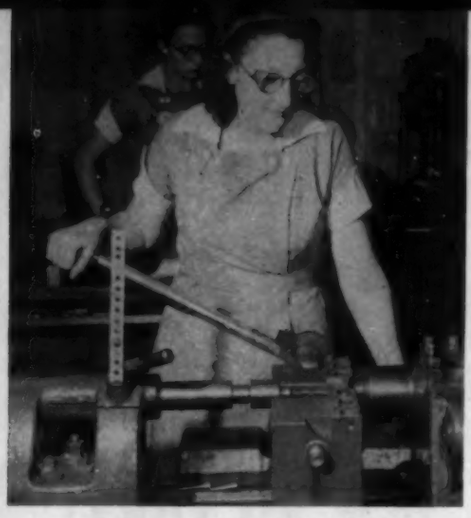

*A tool company's "women-only" policy has developed a force of over 1600 trained machinists. Page 68*


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# SEGREGATED *Scrap...* is your link to VICTORY!

Scrap salvage is a vital factor in the war effort. To be fully effective a scrap program must include methods for segregating and conserving critical alloying elements so urgently needed in the construction of tanks, guns, ships and planes.

Ferrous and non-ferrous metal scrap should be collected in separate containers at the machine where they are generated. Each class of high-speed tool steel and each type of constructional alloy steel should likewise be kept separate so that the alloy content can be returned to service.

Remember, — alloy scrap which is segregated, classified and labeled according to type and composition is a vitally important commodity today—and urgently needed to augment primary supplies of Nickel, molybdenum, tungsten, etc.

*The metallurgical experience of our technical staff is available to aid you in these and other phases of metal salvage.*

**KEEP SCRAP MOVING INTO WAR PRODUCTION!**

**THE INTERNATIONAL NICKEL COMPANY, INC.** 67 WALL STREET NEW YORK, N. Y.

# HIGHLIGHTING

## this issue of STEEL

**ALLIES** British industrialists have outlined a postwar program (p. 34) in which they acknowledge a three-fold public responsibility to: The public, to labor and to investors. Admitting the necessity of strict government controls during wartime, they insist that a system of free enterprise should be re-established at the termination of hostilities. Industry's obligation to support certain social reforms, including universal education, allowances for the unemployed, pensions, holidays with pay, and others, is freely accepted. . . Canada continues to intensify her war effort (p. 59) and has expanded her shipbuilding program by 20 per cent in the past three months.

**TRAINING** Educational processes in American schools and universities are being revolutionized by the necessities of war (p. 44), and the effects of changes now being wrought will be carried over into the postwar period. Frills are being abolished, more attention is being given to training in "specifics," and greater use is being made of visual aids. . .

**NEW FACILITIES** Hydroelectric power capacity (p. 60) has been increased 43 per cent during the past year. . . Construction work has been resumed (p. 61) on the $30,000,000 tank armor-plate plant at Chicago, after being halted several weeks ago. Likewise, the cast steel armor-plate plant of American Steel Foundries in the same district has stepped up operations. . . Five independent rubber companies (p. 61) will co-operate to manage a new synthetic rubber plant to be built by the government.

**TECHNICAL** Herbert E. Fleming tells how women are being employed with unusual success by the Republic Drill & Tool Co. Special machines and accessories designed to fit needs of women operators are described (p. 68).

A. S. Jameson presents user report No. 6 in STEEL's new series on experience of prominent users of NE steels (p. 70). He describes details of tests and application of three medium carbon analyses in the NE-8000 series when used as a material for capscrews by International Harvester Co.

Typical examples of what can be done to improve working conditions by co-ordinating paint and light show it is generally possible to get at least 100 per cent more light for each watt of current consumed by planned use of all available reflecting surfaces in a room or department (p. 74).

R. P. Della-Vedowa reports on some of the advances being made in flashwelding aircraft structural sections. Data accumulated now make it possible to preset the welding machine to handle any cross-sectional area, wall thickness or tubing diameter within the machine's capacity and be assured of high quality work. This (p. 80) indicates the great progress being made in resistance welding.

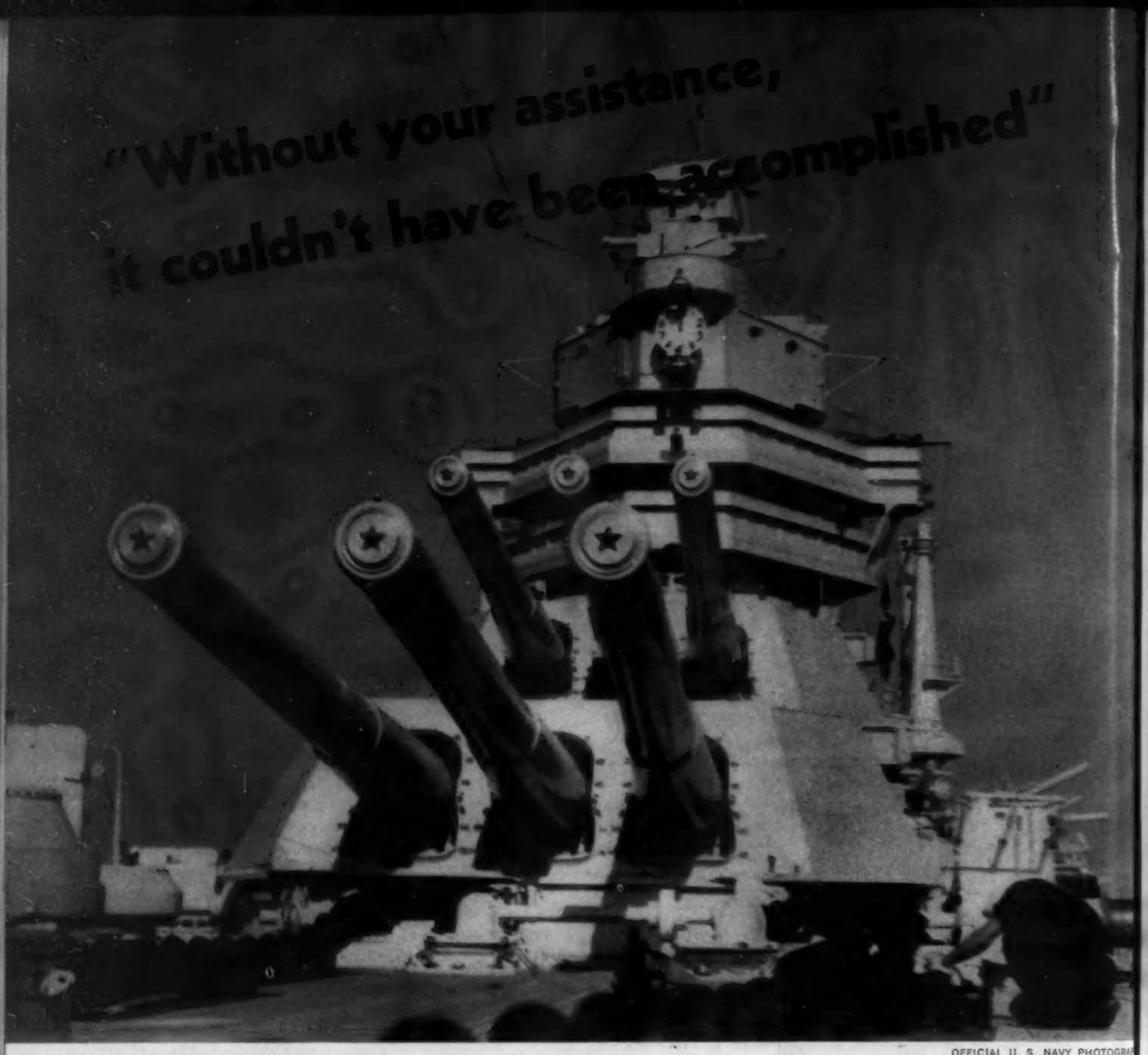
A 300-per cent increase in production is a typical result of the encouragement to improve their own operations that is being given employes in New Jersey plants of Walter Kidde & Co. This company's work simplification plan really gets results by enlisting worker's whole-hearted co-operation.

George E. Stringfellow explains how a central dispatching system provides prompt delivery and pick-up facilities throughout all portions of the huge Allis-Chalmers plant in Milwaukee. This industrial "taxi" service (p. 76) serves many separate buildings and departments.

J. M. Merle concludes his discussion of the film-refining process of steelmaking (p. 84) and tells of the industrial applications of the process including slag refining procedure.

**MATERIALS** Steel and munitions making resources of the United States, Canada and the United Kingdom will be pooled (p. 48) in a move to produce the maximum of weapons necessary for the defeat of the enemy. . . Closer control has been established (p. 48) over carbon steel made in electric furnaces, tool steels, and cobalt. . . Restrictions on the use of tin (p. 47) have been tightened. . . WPB plans the purchase of steel scrap on the West Coast (p. 38) to clear dealers' yards.

**LABOR** "Time Clock" competitions have been inaugurated by one plant (p. 49) to combat absenteeism. . . Great Lakes shippers, with a record of more than 92,000,000 tons of iron moved last season, are protesting the imposition of the "hiring hall" for ore carriers (p. 63). . . War factories, which generally will observe Christmas as a full holiday, have been asked to (p. 49) operate normally on New Year's Day.




OFFICIAL U. S. NAVY PHOTOGRAPH

Record-breaking service on an important Navy order, made possible by Ryerson co-operation on steel! "Without your assistance, it could not have been accomplished," writes the contractor—and again Ryerson teamwork scores.

Cases like this—in which quick Ryerson steel-service has speeded up war production—run into the thousands! While we have not kept count, enough Ryerson customers are working on war contracts to firmly establish Ryerson steel from stock as a vital part of the war production machine.

Hundreds of plants on war contracts are *depending* on Ryerson for steel. An important order here, too urgent to wait on mill production; a few bars there; some strip or a few sheets somewhere else. It multiplies into tremendous tonnage—all labeled "RUSH"—and it's all going into tanks, planes, guns and ships to beat the Axis!

It is a source of pride to the Ryerson organization that its One Hundredth Year finds it on the direct line of greatest service in the war production program—There is a great deal of satisfaction in a War Production Unit report: "Without your assistance it could not have been accomplished."

JOSEPH T. RYERSON & SON, INC. · Chicago · Milwaukee · St. Louis · Cincinnati
Detroit · Cleveland · Buffalo · Boston · Philadelphia · Jersey City

# RYERSON STEEL-SERVICE

STEEL
December 21, 1942

# The Key to Dormant Scrap

*Executives in the iron, steel and metalworking industries are so close to certain details of the scrap problem that they are likely to overlook some of its broader aspects.*

*As a rule, manufacturers make sure that production scrap—the scrap yield from production and manufacturing operations—moves promptly to the furnaces. They know that the recent general scrap drive provided a sizeable tonnage of miscellaneous waste metal which eventually will prove useful. They are familiar with the yield of scrap from auto graveyards and from special projects, such as abandoned bridges, buildings, street car and interurban lines, etc.*

*But there is another source of good scrap which deserves the special and continuing attention of executives. The source is industrial America and the scrap is dormant scrap. Dormant scrap is defined as "obsolete machinery, tools, equipment, dies, jigs, fixtures, etc. which are incapable of current or immediate future use in the war production effort because they are broken, worn-out, irreparable, dismantled or in need of unavailable parts necessary to practical re-employment."*

*Scrap conforming to this definition abounds in every producing fabricating and manufacturing establishment in the country. To get it out of the plant and into use is a task which requires action on the part of the chief executive. He alone can issue orders which will be effective in the disposition of dormant scrap.*

*This has been proved time and time again by actual experience. When a manufacturer leaves it to his department heads or foremen to decide which items shall be scrapped, they are inclined to play safe by holding on to anything which they think "may come in handy later on."*

*The better way is to appoint a top official having inter-departmental authority. Clothe him with the power to make decisions. The result will be a thorough house-cleaning for the plant and a rich yield of dormant scrap for the war effort.*

E. L. Shaner
*Editor-in-Chief*

# Postwar Program Outlined By Leading Industrialists

***Three-fold responsibility to public, labor and investors recognized. Social obligations freely accepted. Re-establishment of private enterprise system held essential to healthy economy***

By VINCENT DELPORT
*European Editor, STEEL*

*LONDON*

AN important and highly significant statement has been issued by a group of 120 British industrialists which includes a number of the most prominent industrial leaders of the country.

Among the signatories are representatives of the iron and steel, electrical, chemical, automobile, construction and other industries. They make no claim to speak for anyone but themselves, and only as industrialists. They made this statement with a view to emphasizing the part played by industry in the economic and social life of the nation, and also the duty to the community which lies upon those responsible for the conduct and management of industry.

The statement embodies a program of future action and is therefore of considerable interest in view of the period of reconstruction that will follow immediately on the termination of the war.

The principles on which the statement is based are highly commendable, while certain suggestions are of a controversial nature. The statement is reviewed at length because, having been issued by a group of responsible men, most of whom have reached the top rank in their respective fields, the ideas expounded are indicative of the present trend of thought.

In an introduction, the authors state that industry "has a three-fold public responsibility: to the public which consumes its products, to the public which it employs, and to the public which provides the capital by which it operates and develops."

The idea of service to the community is stressed and it is deemed possible to achieve the stated objects "without embarking upon changes in the social system such as might seriously and detrimentally dislocate the working basis of the national economy." This is no call for revolution but a plea to follow the call of progressive thought.

The statement is divided into four sections. In the first, the authors review the achievements of industry, outline the problems which it will have to face after the war, and indicate the social and other obligations which it will have to assume if it is to solve these problems successfully and to discharge its three-fold public responsibility.

It is pointed out that modern industry has grown up under the system of private enterprise, and thanks to the investment of savings or property, at the choice of the small saver as well as of the big investor.

The progress made by industry and the increase in the real wealth of every section of the community are the results of the system and has only been limited by difficulties arising in the fields of exchange and distribution which, it is implied, are not the direct responsibility of the industrialist.

The tendency in late years has been towards an increase in the size of business units, with a corresponding increase of directors and managers' sense of responsibility to the community, comprising consumers, workmen and investors. Industry's task now is to improve conditions further and great changes will have to be made, with a view to increasing efficiency in every branch of industry. It is stated that a first charge upon industry should be to establish and have accepted a code of obligations towards employes.

### Plea for Private Enterprise

The authors emphasize their belief that "it is a necessary condition of achieving (the required) efficiency that the system of private enterprise should continue." They further state: "We do not think that the profit motive should be eliminated from our industrial and trading system," because it plays a vital part as a driving force. "The motives of service and of profit are not mutually exclusive."

It is recognized that "for a period after the war the regulation of many types of imports and exports will be a matter for government control, and measures such as the licensing system should continue for some time to regulate the movement of goods and the balance of payments." The importance of better organization of export interests and greater collaboration with the government is stressed, as also the necessity of paying more attention to individual requirements of overseas markets.

Industry must conform to Parliament regulations on behalf of the community, but at the same time it is entitled to ask that the government should consider the effects of legislation on costs and prices. It is stated that "before the dividend stage is reached, industry must be allowed to reserve adequate profits to provide for expansion and improvement." Financial results should be publicly disclosed.

Dealing with the obligations of industry to labor and the social services, the hope is expressed that "the authority of the trade unions within their own ranks will be strengthened and that increasingly close collaboration will be achieved between them and management." The expansion of the formation of works councils to act in an advisory and consultative capacity is recommended.

### Equal Opportunity for All

To the extent to which it is the bound duty of industry and not that of the government, it is proposed that equal opportunity be made available for every man and woman entering industry to rise to positions of greater responsibility. A basic level of wage should be established to enable every worker to afford a decent standard of life, and this should be supplemented by a system of payment by results.

With regard to unemployment, the government should see to it that a man out of work through no fault of his own should receive, as a right, a reasonable subsistence allowance, and schemes of public work should be planned to absorb unemployment. It is suggested that a part solution of the problem would be for the government to give financial assistance to industry for equipping itself with up to date plant and equipment and developing industrial schemes, which would give work to a number of people.

Recommendations are made with regard to National Health Insurance, holidays with pay, hours of work, family allowances (both for employed and unemployed), which are matters for state legislation. Industry should supplement state old age pensions, and it should be its duty to ensure that its employes are properly housed on reasonable terms.

Dealing with education, it is recommended that the school-leaving age

should be gradually raised to 16, with part-time compulsory education up to the age of 18. All who are prepared to take advantage of it should have equal opportunity of receiving the full benefits of complete education. All should be educated to a full sense of national duties and responsibilities. Industry should give much thought to schemes for industrial and vocational education and training.

**Frameworks for Industry**

The second section of the statement discusses the various frameworks within which industry can function and their appropriateness to the general conception outlined in Section I.

The view is stressed that "any great extension of state ownership and operation to industry would so injure efficiency as to be a national calamity." It is recognized that government control is necessary and possible in war time, but its extension into times of peace "would be wasteful, clumsy and destructive of development and initiative."

Mention is made of corporations acting under a statutory charter or act of Parliament, as do the Central Electricity Board or the London Passenger Transport Board. It is thought that to apply this principle to industry in general would be "a retrograde step which would not in the long run prove advantageous to the public."

It is deemed essential that business owned and operated by individuals should continue to exist as an integral part of industry, and on an equal footing with other forms of industry as regards competition.

The co-operative movement in Britain owns substantial manufacturing capacity, and it is linked to, and controlled by, the co-operative system of retail distribution. The authors of the statement make the point that "the co-operative movement must be expected to conform to any arrangements which are applicable to all forms of manufacturing industry, and as a corollary it should have a voice in all industrial matters." This point may need clarifying.

In referring to large companies and combines, the statement looks upon them as a necessity. It says: "Properly administered amalgamations, commanding the services of technical, commercial and financial experts and consultants, provide in our view a more effective spur to efficiency than unchecked competition." It is also pointed out that the considerable financial resources of large companies and combines enable them to pursue an active research and development policy. On this point one might suggest that trade organizations could also pursue such a policy by pooling the resources of their members.

The statement mentions the important part played by trade associations, but it points out that such associations can be operated merely for price maintenance which may afford protection to the inefficient or high cost producer. Such a policy is condemned and the authors emphasize that "it should always be the aim of industry to maintain production and consumption at the highest possible level." The stabilizing influence of international cartels is mentioned.

**Outline Essentials**

Section III of the statement indicates the general lines upon which the closer organization of industry could proceed.

The authors restate their aim as being "to assure to the consumer the full benefit of constant technical progress reflected in higher quality or lower prices or both, while at the same time establishing greater economic security for all than heretofore." Pointing out that violent fluctuations arise largely from the uncoordinated action of competing firms and from lack of proper liaison with the government, it is stated that "the relations between firms, between different industries, and between industry as a whole and government should be more fully and comprehensively organized in some form of permanent association."

The structure of such an organization is sketched as follows:

1. The classification of industries into sections.

2. The setting up of sectional associations, based on the above suggested classification, and operating where necessary through local or sub-associations; the object aimed at being to co-ordinate the activities and secure the collaboration of all producers in each section.

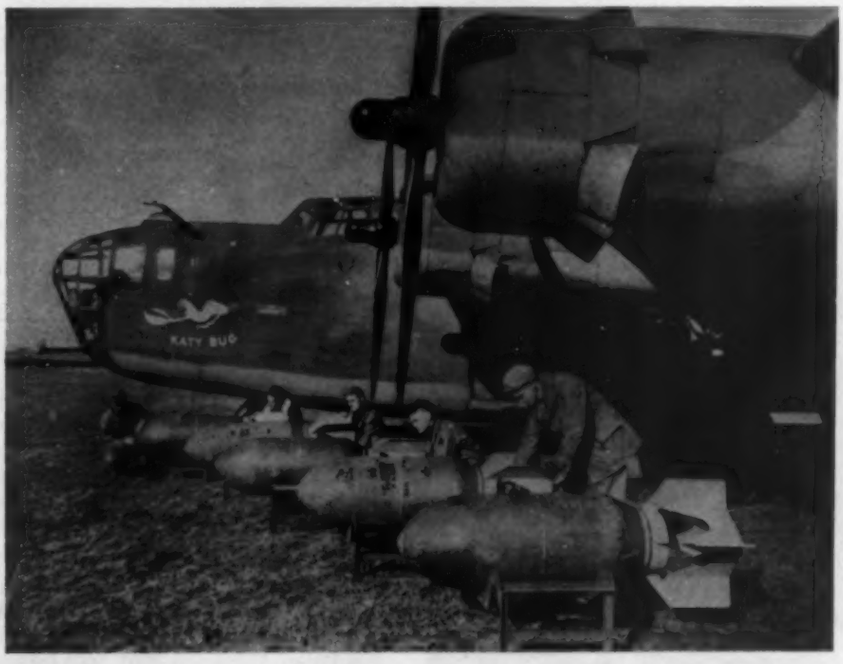
3. Whether the sectional associations be already existing but suitably modified organizations, or new ones, there should be a measure of uniformity in their constitutions, and "special arrangements should be made to ensure the adequate representation of small firms . . . . which might otherwise be dominated by the controlling position of one or more producers in their section."

4. Sectional associations would be under the general direction of their Councils and would be assisted in the performance of their duties by a trained managerial and intelligence staff.

5. A central Council of Industry, representative of the whole of industry, is contemplated. The objects of the Council would be to formulate the views of industry on questions transcending the limits of any one trade.

6. The Central Council of Industry

## HEAVY AMERICAN-MADE BOMBS ARRIVE IN BRITAIN




**AMERICAN-MADE 1000-pound bombs are loaded on Liberator bombers preparatory for the last leg of their voyage to Axis-held territory. The planes are manned by American crews and are of the type that recently raided Lille. NEA photo**

should be a body elected at fixed intervals by the councils of the associations. Its functions would be: (a) to maintain contact with the Sectional Associations; (b) to maintain contacts with the Trades Unions Congress; (c) to act on behalf of British Industry in regard to international economic co-operation and world trade; (d) to give consideration to other matters of high economic policy; (e) to establish a highly qualified intelligence service which could act in an advisory capacity to the government; (f) to act as a medium between industry and the government in suggesting changes in industrial and social legislation and generally representing the interests of industry.

7. The authors of the statement now come to a highly controversial point; they point out that the organization of industry as outlined above would have a limited usefulness only, if a considerable number of firms did not join their respective associations, or, having joined them, if they did not fulfill their obligations. The question is therefore posed: to what extent associations and their councils should be given specific powers, within prescribed limits, to make regulations and to enforce decisions and, "whether membership of associations should be made compulsory." The authors take good care to make it quite clear that the granting of such powers would be a matter for the determination of Parliament. They also state that it is a cardinal point in their proposals that ample provisions should be made for the protection of the public as consumer. However, the idea of compulsory membership of trade associations is of a somewhat revolutionary character, and not one to be adopted lightly. Finally the authors consider that means must be provided by which any individual firm, particularly among the small producers, could appeal against decisions or regulations of sectional associations or of the Central Council, and they suggest that an Industrial Tribunal be set up and appointed by the government; the powers and duties of such a tribunal being a matter for determination by Parliament.

The authors of the statement have appointed a commitee to examine the suggestions in detail and to submit a report, and this committee has been instructed to confer on all these matters with existing industrial organizations.

## Building Time for Liberty Ships Reduced Ten Days

American shipyards building Liberty ships continued to turn them out in an increasing number and in a shorter time during the month of November.

Construction figures reveal 68 Liberty ships, a new monthly high for this type of vessel, averaged only 56 days from keel-laying to delivery. The November average is an improvement of ten days on the October figures. The previous best delivery total of Liberty ships was 67 in September.

Liberty ships are now being constructed in one-fourth of the time that was necessary to produce them last January when the program first got under way. At that time the average was 241.3 days from keel-laying to completion. Since then every month has witnessed a steady and regular reduction in the average.

West Coast yards maintained their lead in the Liberty ship race, with Oregon Shipbuilding Corp. delivering 13 ships into service in an average of 37.5 days, while Richmond Shipyard No. 2 delivered ten ships into service in an average of 43.8 days. The Bethlehem-Fairfield Shipyard at Baltimore took third place by delivering three ships in an average of 46.3 days.

## IMA Asks Investigation Of War Labor Board

Declaring control of powerful labor unions over war production jeopardizes national safety, the Illinois Manufacturers' Association has sent a resolution to all members of Congress asking an investigation of the operations of the National War Labor Board. The resolution sets forth:

"The National War Labor Board is engaged in the systematic extension and maintenance of the control of powerful labor union leaders over the war production of the nation.

"We believe that such control over war production jeopardizes the safety of the nation.

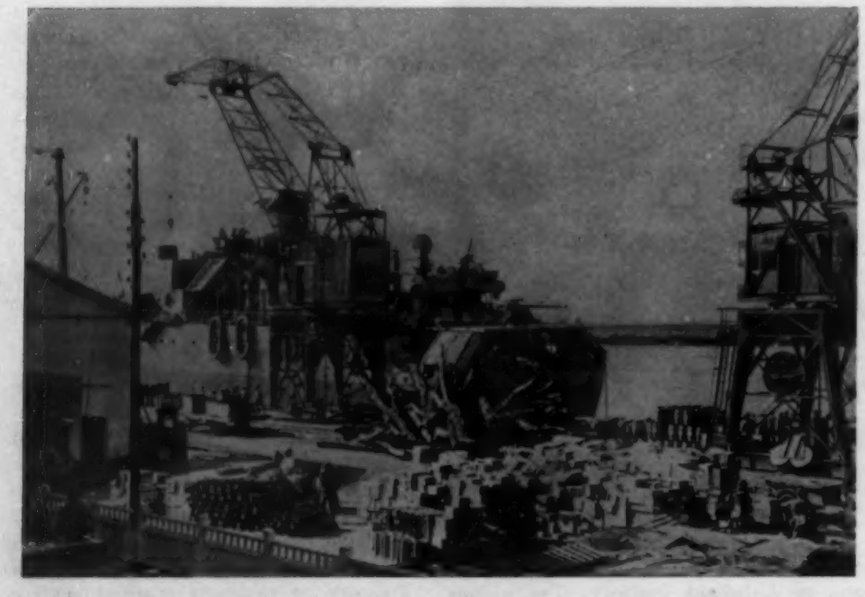
"We urge upon the Congress a thorough investigation and public exposure of the operations of the National War Labor Board, a thorough consideration of the implications and consequences of the policies and operations of the National War Labor Board, and the enactment of legislation necessary and appropriate to guard our war production and our national safety from this critical menace."

## Hanna Co. Takes U. S. Coal As Operating Subsidiary

Following the purchase Dec. 7 of the controlling interest in United States Coal Co., M. A. Hanna Co., Cleveland, has acquired the remaining capital stock and now owns 100 per cent of the former concern, it was announced last week by R. L. Ireland Jr., president of Hanna company's bituminous subsidiaries.

Mr. Ireland also announced that the Hanna Coal Co., M. A. Hanna subsidiary, and United States Coal have been merged and their operations will be conducted in the name of The United States Coal Co., including operation of the Jefferson Coal Co. mines.

## TANK CARRIER SAFE IN AFRICA



ALLIED tank carrier unloads supplies at a dock in Safi, French Morocco, during the invasion of North Africa. NEA photo, passed by censors

# Steel Mills' Accident Prevention Record Equals That of 1940-41

STEEL mills in the National Safety Council's Metals Section safety contest held their own against the drain of accidents upon manpower resources during the latest contest year and finished with an accident frequency rate of 4.81 per 1,000,000 man-hours worked, unchanged from the previous competition.

In a summary of the 1941-42 contest the council reported the following accident frequency rates and the percentage changes from 1940-41 for each of the five divisions of the contest.

| Division | Average Rate | Change |
|---|---|---|
| Steel mills | 4.81 | 0 |
| Light machine shops | 5.56 | — 8% |
| Rolling, finishing and fabricating | 9.62 | +13% |
| Heavy machine shops | 10.63 | + 9% |
| Foundries | 19.48 | +24% |

Average rate for all participants in all divisions was 8.05. Injuries averaged one for every 62 employes.

Frequency rates averaged 10 per cent higher than in the previous contest.

"Group A" plants, consisting of the largest in each of the contest divisions, had sharply lower rates than did the small plants.

Nineteen of the 357 plants which participated went through the contest without a single reportable injury.

Winners in the various divisions and their accident frequency rates were:

**Steel Mills**

(Large Plants—Average Rate, 4.46)

1. Republic Steel Corp., Warren, O., plant, 1.58.
2. Bethlehem Steel Co., Bethlehem, Pa., plant, 2.16.
3. Bethlehem Steel Co., Johnstown, Pa., plant, 2.45.

(Middle-Sized Plants—Average Rate, 6.11)

1. Republic Steel Corp., South Chicago works, 1.10.
2. Continental Steel Corp., Kokomo, Ind., division, 2.48.
3. The American Rolling Mill Co., Ashland, Ky., division, 3.38.

(Small Plants—Average Rate, 7.30)

1. The Youngstown Sheet & Tube Co., Hubbard works, 0.0.
2. The Youngstown Sheet & Tube Co., South Chicago works, 0.65.
3. Carnegie-Illinois Steel Corp., Joliet, Ill., works, 2.73.

**Light Machine Shops**

(Large Plants—Average Rate, 4.98)

1. Mine Safety Appliances Co., Pittsburgh, 0.23.
2. Pullman-Standard Car Mfg. Co., Aircraft division, Chicago, 0.56.
3. Westclox Division, General Time Instruments Corp., La Salle, Ill., 0.62.

**Rolling, Finishing, Fabricating**

(Large Plants—Average Rate, 7.88)

1. General Cable Corp., Buffalo, 1.31.
2. Pullman-Standard Car Mfg. Co., Hammond, Ind., 1.53.
3. Carnegie-Illinois Steel Corp., Duquesne bar mills, 1.63.

(Middle Sized Plants—Average Rate 17.49)

1. Republic Steel Corp., Niles, O., plant, 0.0.
2. Republic Steel Corp., Steel & Tubes Division, Brooklyn, N. Y., plant, 0.0. (First two tied for first).
3. Lehigh Structural Steel Co., Allentown, Pa., 1.38.

(Small Plants—Average Rate, 16.64)

1. Republic Steel Corp., Truscon Steel Co., Los Angeles, 0.0.
1. Union Drawn Steel Co., Ltd., Hamilton, Ont., Canada, 0.0.
1. Bethlehem Steel Co., Danville plant, 0.0.
1. Canton Culvert Division of Republic Steel Corp., 0.0. (Tied).

**Heavy Machine Shops**

(Large Plants—Average Rate, 9.56)

1. The Lycoming Division, Aviation Mfg. Corp., Williamsport, Pa., 1.18.
2. General Electric Co., Philadelphia works, 1.30.
3. S. Morgan Smith Co., York, Pa., 1.45.

(Small Plants—Average Rate, 27.46)

1. United States Rubber Co., Shoe Hardware Division, 0.0.
2. Link-Belt Co., Caldwell (Chicago) plant, 4.68.
3. Moloney Electric Co., St. Louis, 5.55.

**Foundries**

(Large Plants—Average Rate, 18.78)

1. James B. Clow & Sons, National division, Birmingham, Ala., 0.0.
2. American Radiator & Standard Sanitary Corp., Louisville, Ky., 1.38.
3. E. I. du Pont de Nemours & Co. Inc., Wilmington, Del., shops, 1.48.

(Small Plants—Average Rate, 27.65)

1. James B. Clow & Sons, Newcomerstown, O., 0.0.
1. Louisville Car Wheel & Railway Supply Co., Louisville, Ky., 0.0.
1. Pullman-Standard Car Mfg. Co., Michigan City, Ind., 0.0. (Tied).

Small plants had an average of 13.31. Seven tied with perfect no-accident records. They are listed in order, according to the number of man-hours worked, the first named having worked the largest total:

Sylvania Electric Products Inc., Lighting Division, Ipswich, Mass.; The Perfect Circle Co., Tipton, Ind.; Kester Solder Co., Chicago; Sylvania Electric Products Inc., Mechanical Division, Emporium, Pa.; The F. W. Wakefield Brass Co., Vermilion, O.; Sylvania Electric Products Inc., Lighting Division, Filament Department, Salem, Mass.; The Perfect Circle Co. Ltd., Toronto, Can.

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Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has announced it is working on more than $3,000,000 worth of electrical equipment for 24 key plants in the synthetic rubber program. Some of this equipment already has been delivered and Westinghouse divisions are speeding production on the balance.

## EARN WHILE THEY EAT

ROLLING cafeterias which give "machine-side" lunch service to workers throughout Lodge & Shipley Machine Tool Co.'s plant in Cincinnati are stocked with hot, nutritious foods from this new plant kitchen. Chef Vern Tepe and staff are here shown hurrying to meet the requirements for "another round of the steam wagons," at 11 a.m., 7 p.m. and 2 a.m.

# Metals Reserve Co. Asked To Buy 35,000 Tons Scrap on West Coast

DONALD M. NELSON, chairman of WPB, announces he has asked the Reconstruction Finance Corp. through its Metals Reserve Co. to purchase 35,000 tons of prepared iron and steel scrap in the West Coast region. He requested that these purchases be made within the next 30 days.

The request, instigated by a relative abundance of scrap in the Pacific area, was aimed at providing definite means for removing accumulated scrap from dealers' yards in order to allow them to improve and accelerate their operations.

Metals Reserve Co. has been asked to establish stockpiles of prepared iron and steel scrap at points to be designated by the War Production Board within Utah, Idaho, Nevada, Washington, Oregon and California. Purchases, to be made where scrap congestion is the greatest, shall be within the ceiling prices established by the OPA and shall be under the direction of the WPB. Sales will also be under the direction of the WPB after consultation with Metals Reserve Co. and in accord with prices established by OPA.

The national salvage program has continually emphasized the immediate collection of scrap iron and steel in order to provide steel furnaces with sufficient inventory for the winter months. At the present time, furnaces are operating with adequate supplies of scrap, supplied in large part by the recent newspaper scrap metal drive, and have not as yet needed the metal collected in areas remote from the mills.

## Scrap Salvage Campaigns Near 7,600,000-Ton Goal

*PITTSBURGH*

Local office of the Industrial Salvage Section reported 70 per cent of its quota reached by Dec. 1 and expectations of another 100,000 tons during the month of December, which would bring its total up to about 90 per cent.

Much of the material gathered through these drives has now reached the consuming market, although considerable tonnage remains in scrap yards. This is true particularly in the Pittsburgh district where disposition of the public scrap drive was made only three weeks ago. All material collected in the public scrap drive has now been classified and removed to dealers' yards for loading and shipping to the mills.

Virtually all mills in this district are taking whatever scrap they can get and have not yet become very choosey about quality. The general feeling among mill purchasing agents here is that the market will become acute again in about four weeks and any scrap of any type which can be accumulated now will be of immeasurable value later on. For this reason cars of scrap rejected in other districts have been flowing into the Pittsburgh district, although it is still true that local mills are not anxiously bidding for outside scrap. Springboard prices are still fairly unpopular here because volume of local scrap has been satisfactory to meet needs and provide a small cushion.

## Manpower Shortages Plague Chicago Area Scrap Dealers

Called for the purpose of considering several important matters facing the industry, such as the apparent surplus of certain grades of scrap and shortages of manpower, the meeting of the Chicago chapter, Institute of Scrap Iron and Steel Inc., Dec. 8, produced extended discussions but few conclusions or recommendations for solutions.

The manpower shortage question commanded the most attention, but is so perplexing that it defies a direct remedy. Pirating by other industries paying higher wages is depleting the ranks of yard workers, and new labor can scarcely be found. Because of the OPA ceiling prices on scrap and the fact that extreme demand for mill scrap holds buying prices up, yards are obliged to operate within an extremely narrow margin, which prevents them from either paying lower prices for material or increasing wage rates. As for the latter, government has frozen wage rates in certain brackets.

Usual complaint is that scrap yard workers are hired away by another business which places them in new classifications at higher pay. No one seems to know what action should be taken, but it was suggested that the scrap operators should be recognized as an essential industry and treated the same as other essential industries insofar as manpower is concerned. A few women have been employed in scrap yards, but they are not suited for this type of work; consequently this cannot be regarded as a solution to the problem.

As for the apparent surplus of certain grades of scrap, this situation applies largely to cast grades and turnings. Washington at the moment is giving serious attention to both of these items and under consideration is the matter of stockpiling against future needs. If done under government auspices, there might be a sacrifice of profit of dealers. Another proposal is that dealers do their own stockpiling on their own properties.

Another thought, applying principally to cast, is that the material be allowed to seek its own price level under the law of supply and demand—so long as the price remains below maximum, and thus encourage foundries to melt cast scrap in preference to pig iron. It was pointed out that the fixing of the maximum price of cast above steelmaking grades tended to increase the use of pig iron. This also encouraged scrap collectors to segregate cast more diligently than previously, thus increasing the supply. Coupled with this, many gray iron foundries have shut down or curtailed through lack of war business, decreasing demand for cast and creating a surplus.

Careful study now is being made of the surplus of turnings, which are too abundant for loose charging into steelmaking furnaces. Compressing them into bundles without a binder or wrapper, as required under present regulations, has not been completely successful, particularly for high-carbon and alloy grades which are springy. Under consideration are changes in the regulations permitting use of binders or wrappers, but details are yet to be worked out. Compressed into bundles, turnings would make excellent scrap and would assist in eliminating surplus.

## More Pig Iron, Less Scrap Used in Steel

Lack of abundant supply of steelmaking scrap during the period when maximum steel production is demanded has brought about a change in production of scrap and pig iron charged in open-hearth furnaces and placed an added burden on blast furnaces.

Reports to the American Iron and Steel Institute show that in 1941 an average of 557 tons of pig iron was charged for production of each 1000 tons of open-hearth steel but in recent months this has risen to as much as 593 tons. Scrap charge in the same period has dropped from an average of 523 to 496 tons. By this change in practice and also by using a slightly greater proportion of iron ore in the open hearth steelmakers have been able to produce more steel than in 1941, in spite of the scrap problem, the institute comments.

## Eleven Months Pig Iron Nearly Equals All 1941

Pig iron production in November totaled 5,026,220 net tons, compared with 5,165,012 tons in October, the American Iron and Steel Institute reports. Ferromanganese and spiegeleisen produced in blast furnaces was 57,707 tons in November, 71,596 tons in October. Total blast furnace production in November was 5,083,827 tons, against 5,236,608 tons in October. The November production was at 101.8 per cent of capacity, compared with 101.6 per cent in October, the shorter month accounting for the smaller tonnage.

For 11 months pig iron output was 54,190,906 tons, and ferro and spiegel production 589,828 tons, for a total of 54,780,734 tons only slightly less than the full year's output in 1941, which totaled 55,918,086 tons.

Production by districts for November and the year to Dec. 1 is as follows:

| District | November | Year to Dec.1 |
|---|---|---|
| Eastern | 964,929 | 10,318,293 |
| Pittsburgh - Youngstown | 2,077,258 | 22,137,225 |
| Cleveland-Detroit | 532,669 | 5,630,237 |
| Chicago | 1,019,095 | 11,575,669 |
| Southern | 359,889 | 3,769,982 |
| Western | 72,360 | 759,500 |
| Total | 5,026,220 | 54,190,906 |

## Republic To Exceed 1941 Output by 450,000 Tons

Republic Steel Corp. has passed its 1941 production total of 8,116,000 tons of steel. At 7 o'clock the morning of Dec. 11 it had equaled the 1941 figure and steel made in remainder of the month will be "velvet," estimated at about 450,000 tons. This record was achieved in spite of a loss of approximately 110,000 tons early in the year as a result of scrap shortage.

Republic's 1942 output of more than 8,500,000 tons compares with its capacity of 5,500,000 tons at the time of the corporation's formation.

C. M. White, vice president in charge of operations, attributes this record to the policy pursued during the depression of investing large sums to keep facilities in good operating condition and in new equipment and to the fact that steel producing units have been kept in operation a greater portion of the time than in any prior year. Another factor has been addition of facilities by the Defense Plant Corp.

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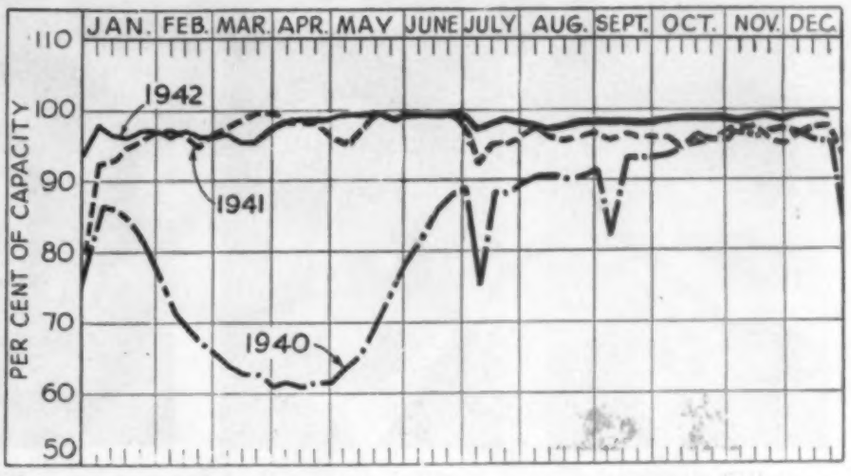
Collection of 6,473,885 pounds of scrap metal in the national parks of the United States during the past year was reported last week by Director Newton B. Drury of the National Park Service.




# STEEL . . . . . DOWN

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week dropped ½-point to 99 per cent. Three districts advanced, six declined and three were unchanged. A year ago the rate was 97½ per cent, two years ago it was 95 per cent, both computed on the bases of capacities as of those dates.

**Chicago** — Down 1 point to 100 per cent, the lowest rate since the first week in December, 1941. Drop was due to taking off open hearths for repair. Scrap is adequate.

**Youngstown, O.**—By cutting idle time for repairs, steelmakers are maintaining production unchanged at 97 per cent, which has prevailed for seven weeks. Three bessemers and 76 open hearths are operating. Christmas is expected to have little effect on steelmaking this week.

**St. Louis** — Lack of scrap compelled one interest to take off four open hearths, cutting the rate 7 points to 87 per cent.

**Cleveland**—Addition of an open hearth increased the operating rate 1 point to 93½ per cent.

**Buffalo** — Capacity operation by one steelmaker increased the rate 2½ points to 93 per cent.

**Central eastern seaboard** — Declined 1 point to 95 per cent. Little change indicated for this week, except for the Christmas layoff.

**Cincinnati** — Furnace repairs cut production 5 points to 87 per cent. Some open hearths will be relighted this week.

**Detroit** — Loss of two open hearths reduced operations 3 points to 92 per cent.

**Pittsburgh** — Slight changes in operating units cut the rate ½-point to 98½ per cent.

**Wheeling** — Production continued at 86½ per cent.

**Birmingham, Ala.**—Maintained steelmaking output at 95 per cent with 23 open hearths active.

**New England**—With two interests working at capacity the district rate advanced 4 points to 96 per cent.

### DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

| | Week ended Dec. 19 | Change | Same week 1941 | 1940 |
|---|---|---|---|---|
| Pittsburgh | 98.5 | —0.5 | 96 | 95 |
| Chicago | 100 | —1 | 103 | 97.5 |
| Eastern Pa. | 95 | —1 | 87 | 95 |
| Youngstown | 97 | None | 92 | 91 |
| Wheeling | 86.5 | None | 91 | 98.5 |
| Cleveland | 93.5 | +1 | 94.5 | 86.5 |
| Buffalo | 93 | +2.5 | 79 | 93 |
| Birmingham | 95 | None | 95 | 97 |
| New England | 96 | +4 | 84 | 100 |
| Cincinnati | 87 | —5 | 95 | 87 |
| St. Louis | 87 | —7 | 91 | 87.5 |
| Detroit | 92 | —3 | 90 | 96 |
| Average | 99 | —0.5 | *97.5 | *95 |

*Computed on basis of steelmaking capacity as of those dates.

## Tennessee Co. Stacks Set New Production Marks

Blast furnaces of Tennessee Coal, Iron & Railroad Co. set new records in November, the six stacks at Ensley, Ala., producing 135,077 tons of pig iron, exceeding the best prior record, March, 1941, when 132,689 tons of iron were poured.

The three stacks at Fairfield, Ala., on Nov. 30 set a 24-hour record of 3016 tons, the best previous record being 2891 tons Nov. 1, this year.

# MEN of INDUSTRY

WALTER H. GEBHART

JOHN P. COURTRIGHT

M. E. FIRST

HENRY A. CHRISTY

**Walter H. Gebhart** has been appointed domestic sales manager, Henry Disston & Sons Inc., Philadelphia. Mr. Gebhart has been associated with the company 33 years, 15 of which have been spent with the sales department.

—o—

**John P. Courtright,** heretofore director of sales, Marion Steam Shovel Co., Marion, O., has been named vice president in charge of sales. Mr. Courtright's sales experience with Marion Steam Shovel Co. dates back to 1927, when he became a salesman in the Chicago territory. In 1936 he became district manager at Chicago and the following year was made sales manager over all districts.

—o—

**Charles J. Otis** has been placed in complete charge of purchases for Ward Leonard Electric Co., Mount Vernon, N. Y.

—o—

**Boyd W. Winter** has been appointed district manager of the Buffalo office of Westinghouse Electric Elevator Co. Mr. Winter has been sales engineer in the Los Angeles office of the elevator company.

—o—

**Harry J. Aldrich,** secretary and assistant treasurer, Spencer, Kellogg & Sons Inc., Buffalo, has been elected a director.

—o—

**R. E. Zimmerman,** vice president, United States Steel Corp., Pittsburgh, was re-elected president, American Standards Association, New York, at that organization's annual meeting in New York, Dec. 11.

—o—

**J. Clark Samuel,** the past two years director of publicity, Anderson, Davis & Platte Inc., New York advertising agency, has joined Rustless Iron & Steel Corp., Baltimore, as editor of *Employee Information.* Prior to his New York connection, Mr. Samuel served in a public relations capacity for Armstrong Cork Co., Lancaster, Pa.

—o—

**M. E. First,** formerly chief engineer, C. O. Bartlett & Snow Co., Cleveland, has been appointed director of the foundry equipment department. Mr. First is a director and has been chief engineer the past 22 years. **Henry A. Christy,** associated with the company about 19 years, has been elected a member of the board of directors. Since 1936 he has been superintendent.

—o—

**Keith Williams,** vice president and general manager, Pratt & Letchworth Co. Inc., Buffalo, has been elected president, succeeding **C. E. Swank,** who remains a member of the board of directors. Mr. Williams joined the company in 1926 as works manager.

—o—

**C. A. Stoeckler,** Crucible Steel Co. of America, has been named president,

CHARLES L. HUSTON JR.

*Who has been appointed assistant to president, Lukens Steel Co., Coatesville, Pa., as noted in STEEL, Dec. 14, p. 55*

Steel Club of Philadelphia, to succeed the late H. E. Richardson, Youngstown Sheet & Tube Co. He likewise will succeed Mr. Richardson as chairman of the committee in charge of the steel producers' dormant scrap collection program in the district.

—o—

**Charles C. Fichtner** has been appointed vice president and treasurer, Strippit Corp., North Tonawanda, N. Y. Fichtner formerly was associated with the United States Department of Commerce, where he was chief of field service and chief of Division of Regional Economy.

—o—

**Dean M. Warren,** in charge of technical publicity at General Electric Co.'s Nela Park plant, Cleveland, has been transferred to the Empire Division of the firm's lamp department at Buffalo. He will devote his time to wartime lighting of industries in that area.

—o—

**R. E. McDonald** has been appointed advertising manager, Dumore Co., Racine, Wis., replacing **R. B. Voelker,** who will soon be in military service. Mr. McDonald was formerly assistant to the advertising manager and editor of the house organ of Fairbanks, Morse & Co., Chicago.

—o—

**R. M. Ellis** has joined Aircraft Parts Development Corp., Summit, N. J., as chief mechanical engineer. Mr. Ellis brings to this post an experience of 20 years in research and product design, gained through his connections with Brewer Tichenor Corp., Remington-Rand Inc., Pathe Film Corp., and Conmar Products Corp.

—o—

**Glenn W. Shetler,** formerly production manager at the Syracuse, N. Y., plant of Crucible Steel Co. of America, has become associated with Barium

WILLIAM C. CARTER

*Whose election as president, Link-Belt Co., Chicago, was reported in STEEL, Dec. 14, p. 55. Mr. Carter succeeds Alfred Kauffman, who has resigned because of ill health*

Stainless Steel Corp., Canton, O., as general manager. Mr. Shetler has been identified with the steel industry since 1916, when he joined United Steel Co., Canton, now a part of Republic Steel Corp. He joined Crucible Steel in 1928 and in March, 1941, organized the order and production department for the Sanderson and Emerson works and Halcomb Division, all in Syracuse.

**Robert A. Fox** has been named personnel manager, Hagerstown plant, Perfect Circle Co., Hagerstown, Ind., and will work under direct supervision of **Howard M. Dirks**, personnel director of all the company's plants. Mr. Fox has been associated with the company since 1934.

—o—

**Irving A. Oehler** has been appointed chief metallurgist, American Welding & Mfg. Co., Warren, O. Mr. Oehler has been with Republic Steel Corp. in its Buffalo district since completing his education at Rensselaer Polytechnic Institute seven years ago. Starting as a helper in the metallurgical laboratory, he subsequently became general analyst in the chemical laboratory, metallurgical observer, metallographist, chief inspector, open-hearth metallurgist and assistant chief metallurgist.

—o—

**W. L. Buchanan** has been appointed field manager of renewal parts sales for Crocker-Wheeler Electric Mfg. Co., Ampere, N. J., with headquarters in Chicago. Mr. Buchanan has been associated with Mesta Machine Co., United Engineering & Foundry Corp., Republic Steel Corp., Otis Steel Co., Youngstown Sheet & Tube Co., and more recently with Carnegie-Illinois Steel Corp., as maintenance engineer and subsequently as chief test engineer of the Gary Works.

PERCY S. BROWN

*President, Consumer Distribution Corp., New York, who has been elected president, Society for Advancement of Management, as noted in STEEL, Dec. 14, p. 72*

## OBITUARIES . . .

**David S. Youngholm,** 53, vice president, Westinghouse Electric & Mfg. Co., in charge of the company's Lamp Division, Bloomfield, N. J., died recently. During a career of more than 33 years with Westinghouse, Mr. Youngholm became a nationally known authority and executive in the lighting industry. Under his direction the Lamp Division was converted to 95 per cent war production.

—o—

**Hugh Purdy,** 66, widely known in the machine tool industry, in this country and abroad, died Dec. 2, in England. Mr. Purdy served apprenticeship at Pratt & Whitney, Division of Niles-Bement-Pond Co., West Hartford, Conn. and worked there until 1900 when he was sent abroad. He remained in England as representative for Pratt & Whitney, eventually establishing himself with Buck & Hickman Ltd., agents for Pratt & Whitney. He maintained that connection until his death.

—o—

**Harry V. Jamison,** retired official of the advertising division of Carnegie-Illinois Steel Corp. and United States Steel subsidiaries, died Dec. 10 in Pittsburgh. He joined the former American Sheet & Tin Plate Co. in 1904 as advertising manager, and following consolidation of the plate company with Carnegie-Illinois in 1936, Mr. Jamison became a member of the advertising division, remaining there until his retirement last June.

—o—

**Lester G. Black,** 43, president, Black Boring & Machine Co. and Black Drill Co., Cleveland, died Dec. 11 in that city. In 1939 he invented the Hardsteel drill and a year later established the drill company bearing his name.

—o—

**Oscar E. Neidringhaus,** president, Neidringhaus Metal Products Co., St. Louis, died in St. Louis Dec. 14.

—o—

**Herman Cohen,** 79, founder and president, Standard Steel Rail & Equipment Co., St. Louis, died recently.

—o—

**Charles H. Smith,** president and treasurer, Steel Improvement & Forge Co., Cleveland, died Dec. 12 in that city.

—o—

**Walter P. Murphy,** 69, president, Standard Railway Equipment Co., Chicago, and donor of $6,735,000 for Northwestern University Technological Institute, Evanston, Ill., which was dedicated last June 15, died in Los Angeles, Dec. 16, following a three-year illness. He had never visited the institute. Among Mr. Murphy's many inventions were the corrugated steel end for box cars which virtually eliminated the smashing of car ends during starting and stopping; a method for rebuilding old freight cars to accommodate automobiles and refrigerator cars.

—o—

**Jacob Hajek,** 88, one of the organizers of C. O. Bartlett & Snow Co., Cleveland, and associated with the company and its predecessors 55 years, died in Cleveland, Dec. 7. Mr. Hajek retired 25 years ago but retained his association with Bartlett & Snow company.

—o—

**John C. Scheeler,** 55, since 1926 president, Buffalo Wire Works Co. Inc., Buffalo, died in that city Dec. 14. He was also vice president, Buffalo Galvanizing & Tinning Works Inc., and identified with many other business interests.

—o—

**William C. Tamplin,** 66, special representative, sheet sales, Carnegie-Illinois Steel Corp., Pittsburgh, died in that city Dec. 7. He had been associated with Carnegie-Illinois and predecessor companies 42 years.

—o—

**Raymond J. McCabe,** 55, vice president in charge of sales of electrical materials, Indiana Steel & Wire Co., Ind., died Dec. 6. Mr. McCabe spent 30 years with Western Electric Co. and Graybar Electric Co. before joining Indiana Steel & Wire in 1938.

# Steel Artillery Cartridge Cases Now Produced by 50 Manufacturers

*CHICAGO*

MASS production of steel cartridge cases in artillery sizes now is an accomplished fact, with about 50 manufacturers engaged in the program. This was revealed by Lieut. Col. H. R. Turner, chief of the cartridge case unit, Ordnance Department, United States Army, Cincinnati, in addressing the Chicago chapter, American Society for Metals, recently on "Deep Drawing of Cartridge Cases." Colonel Turner is deputy chairman of the Steel Cartridge Case Industry Integrating Committee, which also has its office in Cincinnati.

Significant is the fact that the changeover from brass to steel, because of the critical shortage of copper, has been achieved in about six months. Credit for the job, said Colonel Turner, goes not to a few individuals, but to a large number of people who contributed their time and technical knowledge freely to the problem, which at the outset did not appear promising of early solution. That it was solved so promptly is due partly to the fact that it has been possible to utilize much existing equipment and gain time rather than lose time by installation of new machinery.

Although complete manufacturing details cannot be divulged yet, the speaker was able to provide more information on the highly important and interesting development than has up to the present been released. Production is for the most part accomplished by the cold-forging process, although two manufacturers are using the hot-forging method because of special experience and success with it.

### Difficulties Are Overcome

For simplification of the program, purchase of steel and production of the blanks or disks is centered with a few companies who supply the disks to all case producers. Although specifications for the finished product are most rigid, manufacturers are allowed some latitude as to how they accomplish the end results. All dies have been standardized and are interchangeable among manufacturers, which has served to prevent production tie-ups. This is an important factor, since the dies are carbide materials, supply of which is critical.

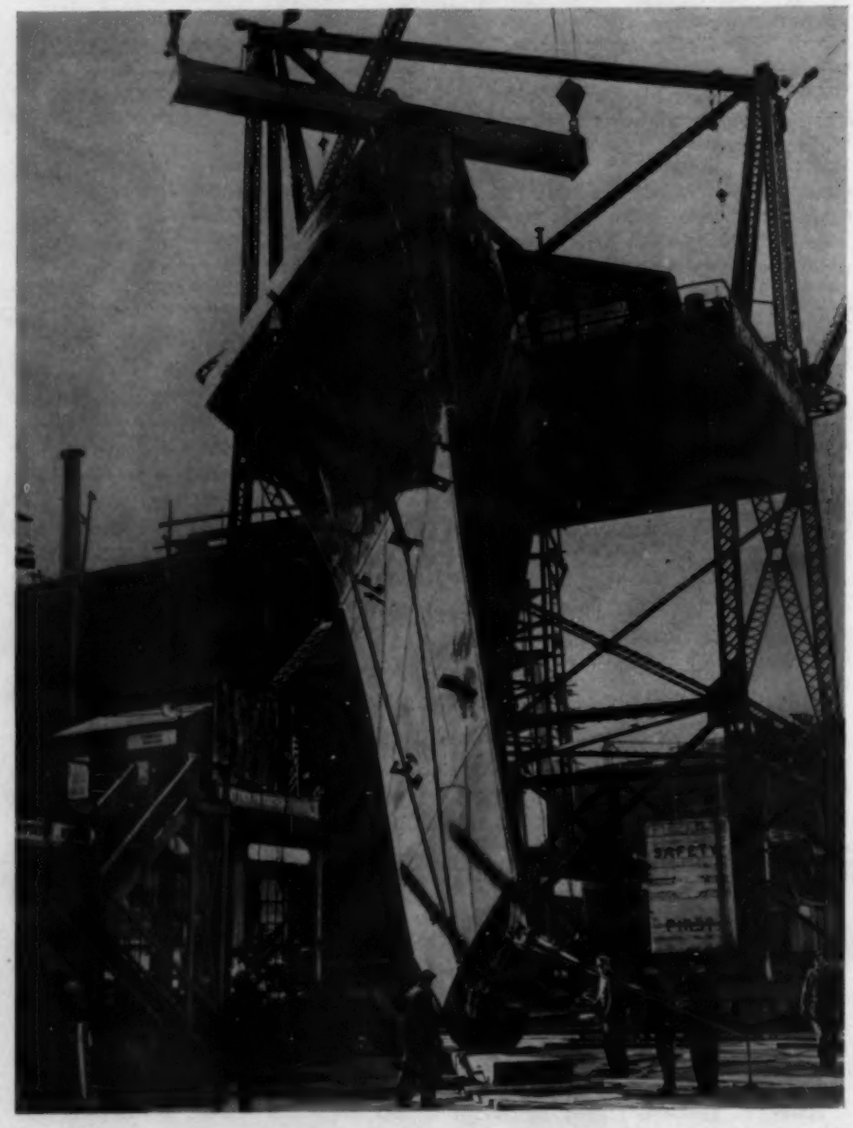
Much of the success which has been achieved in getting production under way speedily is due to the fact that steel cases can be made in the same presses which turn out brass cases. This is despite the general opinion that tremendously greater pressures would be required; actually the pressures are only slightly higher. Further, quality of steel has been no stumbling block, only requisite being that the steel conform to established specifications and is clean. Colonel Turner paid a compliment to steelmakers who have consistently turned out extremely clean and usable steel for cases.

First operation on the disk is a combination cupping and coining operation, and when this is done properly, subsequent drawing operations offer no unusual problems.

Annealing usually is done in atmosphere controlled furnaces, but here also the manufacturer is given some latitude. Temperatures involved are relatively low, consequently scaling is not encountered to an extent that proves troublesome.

Corrosion resistance of finished cases is obtained by applying paint of a phenolic resin type.

## SHIP'S BOW "MARCHES" HALF-MILE TO ASSEMBLY POINT



LIFTED from a horizontal position in which it was built, this ship's nose "marched" nearly half a mile across the Kearny, N. J., yards of Federal Shipbuilding & Dry Dock Co. to be fitted to a cargo ship's hull. The "puppeteers" whose long fingers guided the parade were giant cranes. The Mr. Punch of this little show is 60 feet tall, weighing about 100,000 pounds. But nobody stopped to look, as this was just a small part of work-as-usual at the yards at Port Newark, N. J.

# PRIORITIES–ALLOCATIONS–PRICES

**Weekly summary of orders and regulations issued by WPB and OPA, supplementary to Priorities-Allocations-Prices Guide as published in Section II of STEEL, Dec. 14, 1942**

## M ORDERS

**M-1-i** (Ruling), issued Dec. 8. Aluminum producers, foundries and fabricators desiring to make emergency shipments of aluminum products prior to the month of normal allocation must now secure written statement of approval from the military procurement officer having jurisdiction over the contract for which the material is intended.

**M-14** (Revocation): **Tungsten High-Speed Tool Steel,** effective Dec. 14. Revokes order which had provided that 75 per cent of all high-speed steel orders accepted in any one quarter be molybdenum types and not more than 25 per cent tungsten. Control transferred to new order M-21-h.

**M-21-a** (Amendment): **Alloy Iron, Alloy Steel, Wrought Iron,** effective Dec. 14. Requires producers of alloy iron and alloy steel and producers of electric furnace carbon steel to submit their melting and delivery schedules to WPB for approval. Melting schedules are made on PD-391 and PD-391-a. Tool steel as defined in M-21-h, alloy iron, alloy steel, or electric furnace carbon steel castings are excepted under the order.

**M-21-h: Tool Steel,** effective Dec. 14. Establishes control of carbon and alloy tool steel production. Restricts monthly production of certain high molybdenum type steels to 30 per cent of monthly average tonnages melted during second quarter of 1942; deliveries to 75 per cent of same base period in the fourth quarter of 1942, and to 35 per cent in the first quarter of 1943. Provides that 75 per cent of all high-speed steel orders accepted in any one quarter be molybdenum types, and not more than 25 per cent tungsten type. Producers must file PD-440 monthly, showing melting schedules.

**M-21-e** (Amendment): **Tin Plate, Terne Plate, Long Ternes,** effective Dec. 14. Permits following uses for tin plate and terne plate: Component parts for internal combustion engines including cooling, fuel, and lubricating systems—(but only where the need for corrosion-resistant or solderable parts makes the use of less essential material impractical) electrical equipment parts requiring solderable coatings; gas mask canisters; safety cans for inflammable liquids; vaporizing liquid fire extinguishers; wick holders for oil stoves (replacement only); and heat exchangers. New permitted uses for tin plate are maple syrup evaporators, and linings of drying chambers for milk and egg dehydration.

**M-39** (Amendment): **Cobalt,** effective Dec. 11. Provides complete allocation, except for delivery of 25 lb. or less in any one month. Restricts use further in protective coatings in nonferrous alloys and in ground coat frit. Lists permitted uses. Refiners and processors of crude cobalt must report monthly on PD-581, showing inventory position and schedule of production for ensuing month. Holders of over 100 lb. of contained cobalt must file monthly report.

**M-44** (Revocation): **Titanium,** effective Dec. 10. Removes restriction on use of titanium pigments.

**M-81** (Amendment): **Cans,** effective Dec. 9. Limits use of tin plate, terne plate and black plate for packing food and non-food products in cans; specifies the can sizes which may be used for each product; establishes packing quotas for all items covered.

**M-190: Calcium Carbide,** effective Jan. 1. Prohibits delivery without specific authorization, except in case of monthly shipments of 10 tons or less and deliveries for resale for house or mine lighting. Buyers use PD-600; distributors PD-601.

## P ORDERS

**P-130** (Amendment): **Communications,** effective Dec. 9. Assigns AA-2X rating for orders for material to make emergency repairs in event of breakdown in telephone service; AA-5 blanket rating for maintenance, repair, operating supplies and operating construction. Limits amount of material to which blanket rating may be assigned for operating construction. Use PD-684 with AA-2X rating; PD-685 is application to use defense project rating; PD-716 will be used when application is made to continue beyond 30 days the use of material or equipment installed to meet a temporary emergency requirement.

## E ORDERS

**E-2-b** (Amendment): **Cutting Tools,** effective Dec. 12. Provides that a purchaser may accept deliveries of the "producers' minimum practicable manufacturing quantity." Where quantity is less than three sets of special tools, the purchase may be extended to this amount. Purchaser's inventory must not exceed 90-day needs.

## L ORDERS

**L-22-a: Steel Furnaces,** effective Dec. 31. Bans production of steel furnaces for direct-fired air heating systems, except to meet urgent military needs. WPB will determine where and by whom such products will be manufactured and the place of delivery. Restricts amount of iron and steel for any calendar quarter for manufacture of replacement parts.

**L-33** (Amendment): **Portable Electric Lamps and Shades,** effective Dec. 10. Prohibits production of: lamps and shades containing critical materials; wire-frame shades after Jan. 1, 1943. Lamps and shades may be made for Army, Navy and Maritime Commission but ban applies on use of critical materials in these products.

**L-23-d** (Amendment): **Stoves,** effective Dec. 2. Permits any producer of domestic heating stoves using coal or wood whose factory sales in the year ended June 30, 1941, were under $2,000,000 to use iron or steel without regard to quota limitations. For February and March, quotas are again applied with the use of iron and steel limited to that of one-half the quarterly amount used in the period July 1, 1940, to June 30, 1941.

**L-41** (Amendment): **Construction,** effective Dec. 5. Exempts the following from provisions of the order: Construction of railroad tracks; agricultural construction incident to the erection or installation of machinery or equipment; construction of facilities by the communications industry.

**L-229: Railroad Equipment,** effective Jan. 1. Limits output of specified replacement parts to 115% of 1942 rate. Orders rated AA-2X. Permits purchases of new parts by carriers in amounts in proportion to growth in volume of passenger service.

## PRICE REGULATIONS

**General Maximum Price Regulation** (Amendment), effective Dec. 17. Provides that the 3 per cent property transportation tax, which became effective Dec. 1, cannot be passed on in the form of increased prices.

**No. 43** (Amendment): **Steel Drums, Pails,** effective Dec. 14. Sets maximum price of $35 each for reconditioned 55-gallon stainless steel drums which manufacturers can no longer use because of war regulations. Price is on f.o.b. seller's location basis.

**No. 46** (Amendment): **Relaying Rail,** effective Dec. 19. Sets following maximum prices for light relaying rail: Relaying rails of less than 35 lb. per yard, $45 a gross ton, f.o.b. warehouse in carload lots; $2.25 per cwt for less than carload shipments, with 15 cents a ton added for shipments of less than 5 net tons. Relaying girder rail will have ceiling of $45 a ton minus railroad transportation from the nearest shipping point to the basing point. Provides for the licensing of dealers and waives the requirement for regular monthly reports. Revokes provision which formerly permitted an agent's commission of $1 a ton on certain sales.

## Construction of Civilian Steel Furnaces Halted Dec. 31

Except for urgent military needs, all further production of steel furnaces for direct-fired air heating systems will be halted after Dec. 31 under the provisions of Supplementary General Limitation Order L-22a.

Manufacturers are prohibited from fabricating or assembling any steel furnaces of the types described in the order except when the purchase is specifically authorized by the WPB Director General for Operations on Form PD-704. This form will be used by governmental agencies to obtain heating units for military installations and other war projects where steel furnaces are authorized.

In authorizing production of furnaces for the armed services, WPB may also determine where and by whom the product will be manufactured and it also may specify the place of delivery. This control will permit a large saving of transportation through a shortening of rail shipments and reduction of crosshauls.

Restrictions are placed on the amount of iron and steel that may be put into process in any calendar quarter for manufacture of replacement parts for steel furnaces. After Dec. 31, each producer of parts is permitted to use iron and steel in any succeeding quarterly period not to exceed 200 per cent of the weight of metal put into process by him for the same purpose during the corresponding quarter of 1940.

## Spare Parts for New Equipment Not Exempt from Order L-123

Exemption of general industrial equipment for certain repair and maintenance purposes from the control over distribution does not apply to spare parts for new equipment, according to an interpretation of Order L-123.

The interpretation explains that equipment is considered "new" when it has not been delivered to a person acquiring it for use.

The interpretation also points out that the exemption is intended to provide for the repair and maintenance of any existing equipment which has been delivered for use, including equipment delivered prior to the issuance of the order.

# WINDOWS of WASHINGTON

***Educational institutions also "convert" to war production. Frills discarded as emergency demands practical knowledge. Change expected to have profound effect on postwar methods***

IN no field has war's impact been more profoundly disturbing than that of education. In addressing a student conference in New York, Dec. 5, Dr. George N. Shuster, president, Hunter College, predicted a "good, solid, stern shake-up" of the entire educational system. The pitiless light thrown by the war on American colleges and universities, he declared, has revealed a lack of "any kind of leadership on a national scale".

Dr. Shuster's remarks are doubly significant because they express what many leading educators have been saying recently. Considerable progress has been made in reforming the system of education and many additional changes are under way. These are aimed at helping to win the war, by training many different types of specialists who are necessary to produce for war—and, as Lieut. Gen. Brehon B. Somervell told a meeting of school and college officials, Aug 28, "who know the fundamentals of electricity, who know automotive mechanics, who can operate radios or dismantle carburetors . . . men trained in the efficient use of mechanisms of many kinds."

Army and Navy officers have registered complaints on two scores. One is that it has taken too long to train specialists under educational methods of the past. The other is that the schools have been teaching broad, general principles, the idea being that after the student graduated and entered industry he would be able to apply these broad principles to the particular needs in his industry. The Army and Navy hold that this must be changed, that students must be taught how to work out specific problems, so that they can be put to work effectively immediately upon graduation, instead of requiring a long training period in "specifics". They hold that you cannot really understand basic principles of mathematics and the sciences until after you have obtained the "feel" of them by working out definite problems.

### "Refresher" Courses Helpful

Despite what Dr. Shuster and other leading educators have been saying, the fact is that our schools and colleges already have done a tremendous job in training men and women for war work. In vocational schools, and in high schools with vocational departments, limited training, or "refresher" training, has been given to more than 3,000,000 persons since the summer of 1940 and these have taken jobs in war plants or have been up-graded. It is interesting to recall that approximately half of these came from WPA rolls. At the same time, in 1940, engineering colleges received appropriations enabling them to give refresher courses to engineers to qualify them for special war work. More than 500,000 engineers took these courses and since have been busy in war production.

In addition, many engineering schools, mainly right after Pearl Harbor, inaugurated special war courses to train men for the armed forces, and put them on an accelerated basis to graduate them earlier. Typical, as in the case of Princeton University, are courses in Aerodynamics, Arabic, Japanese, Russian, Automotive Engineering, Camouflage, Chinese, Computational and Graphical Mathematics, Meteorology, Military History and Defense Problems, Military and Political Geography, Navigation (both marine and air), Photogrammetry, Portuguese, Psychological Tests and Their Interpretation, Topography and Map-Interpretation, Radio Communication, Radio Engineering.

### Streamlined Education

Since then the wartime educational system has been further developed and co-ordinated. Last August a "High School Victory Corps", aimed at giving specific courses to 16 to 18-year-old boys and girls which would enable them to be utilized in the war upon graduation, was organized. In September the War Department issued specifications for "pre-induction training courses" in fundamentals of electricity, machines, shopwork, radio and automotive mechanics. These specifications have been recommended to the schools and colleges by the Office of Education. Already much progress has been made in streamlining our education for war. In fact all discussion during the convention of the American Vocational Association at Toledo, O., early in December centered in ways and means to implement this program and get it going in a hurry. One of the principal conclusions was that vocational training should be given as far as possible to all students in the last two years of high school regardless of the type of school they may be attending; textbook instruction must be supplemented by actual shop or factory work.

The direction of wartime education is highly organized. It is implemented by the United States Office of Education as a clearing house for the educational recommendations of all of the governmental departments involved, and is under the direction of the War Manpower Commission. The program is evolved as a result of many discussions both formal and informal in which many of our most high-powered brains participated. Many of our educational frills already have faded from the picture and many more will go. For the first time in our history our entire educational system is being given a thorough going-over by practical men who must use education as one of their essential tools to do a big job in a hurry. It is a "safe bet" that we will never go back to the leisurely, inexpert teaching methods of the past.

There will be a profound effect on postwar educational methods as a result of the development of visual aids in the war teaching program. Sporadic attempts in this direction had been made prior to the war but they never got very far, due to costs. Usually such visual aids were aimed at training salesmen. As far as is known, no attempt was made to utilize visual aids to train shop workers until wartime urgencies made it necessary to employ such aids to give potential war workers a more rapid understanding of shop processes.

The first visual aids in this program were placed under contract by the Office of Education in the fall of 1941 and the first films became available Dec. 1, that year. The contracts were placed with detailed specifications as to what was to be shown in each film. Instead of calling for bids and placing the contract with the lowest bidder, contracts were placed at fixed prices and the contractors were encouraged to deliver the best film it was possible to make on the subject. Acting on this spur the contractors spared no pains and in some cases they shot as much as 60 per cent more than the originally expected footage. But they did deliver good films which, it is estimated, have shortened training periods on an average of 30 to 40 per cent, and in many cases even more. In addition these visual aids have given workers a much better comprehension of their jobs than would have been the case without them.

The visual aids so far produced are 48 in number, of which 38 cover machine shop practice and ten shipbuilding techniques. Schools and industrial plants have bought 12,955 prints. In addition the Army is using 4970 and the Navy 1621. The films vary in length. For example, there is one on the micrometer running to 500 feet.

# In PRESSES too-

## HydrOILics does it better, faster, safer!

Advantages are many in HydrOILic Presses. Typical example of the Denison line is Press DLSC2 for straightening and countless assembling operations . . .

- Exact tonnage for each task is available without adjustments . . . yet, tonnage and stroke limits may be set if desired.
- "Feel-the-Power" control lever governs ram movement with pound-by-pound accuracy.
- Release of control lever brings ram to full daylight opening, or pre-set, at once . . . locks it there positively . . . no "drift."
- Fully self-contained . . . with all working parts easily accessible.
- Compact . . . round-cornered and streamlined for safety . . . ample toe-room.
- Hand-lever or foot-pedal control, or both.
- 25, 50, 100 and 150-ton units.

*Write for Bulletin 109*

DENISON
EQUIPMENT in APPLIED
HydrOILics

# THE DENISON ENGINEERING COMPANY

163 DUBLIN ROAD — COLUMBUS, OHIO

One on the steel rule runs 475 feet. One on cutting a taper with a compound rest and taper attachment runs 400 feet. One on facing, turning, boring, grooving, chamfering on a vertical turret lathe using two heads runs 1125 feet.

One of the important features is the way the cost of such visual aids has been revolutionized. It formerly was necessary to pay about $45 to $50 for a sound film of 400 feet of 16-mm film. Due to volume, the cost of the films made for the Office of Education is $8.47—this for 400 feet of 16-mm film, wound on a reel, packed in a tin can and delivered anywhere in the United States. That means widespread use of such visual aid will be a permanent feature in our educational activities of all types.

There is another valuable feature in using visual aids in that they educate educators. They keep the teachers up-to-date. In the old days students frequently found upon graduation that the professors had been teaching them things that practical men in industry had dropped many years before. This cannot happen when visual aids show the current practice.

The present general acceptance of the concept that text-book instruction must be supplemented by manual or vocational training is not entirely new. It will be recalled, for example, how the University of Cincinnati developed a scheme for organizing its students into teams of two men each. While one-half of the team studied two months at the college, the other half worked two months in one of the shops in the area. At the end of the two months they would change places. Under this scheme the employer was assured of a labor supply at all times. Georgia Tech and a number of other colleges adopted "co-op" schemes of a similar nature. Unfortunately, the depression of the 30's discouraged these plans since the scarcity of work made it necessary for employers to confine it to family men. With the lessons that have been learned during the war, however, it is logical to expect that postwar education will be featured permanently by vocational methods.

### Postwar Education a Problem

Most men in industry probably would consider themselves to belong in that great group in the United States that is called the "middle class", a group which many fear is threatened with extinction in view of the rapidly increasing load of taxation that is being saddled upon it. Many middle classers, remembering how hard it was for them in comparatively lush times, to get their education are wondering just what they are going to do to get their sons and daughters educated after the war. To those who have such fears of the future it should be of interest to know that the subject of postwar education is a problem on which many minds are being focused. Some of the opinions have a socialistic tinge. For example, Mrs. Franklin D. Roosevelt in addressing an educational group early in December made this statement:

"I am all for the plan that people who earn education by being capable should get education free when the war is over."

That is something to think about—for a liberalization to the extent of providing education free of charge, probably would be accompanied by other liberalizations. One recalls the rather recent talk about socializing medicine, recent attacks on the profit motive, also the lengths to which we already have gone in the direction of socialism.

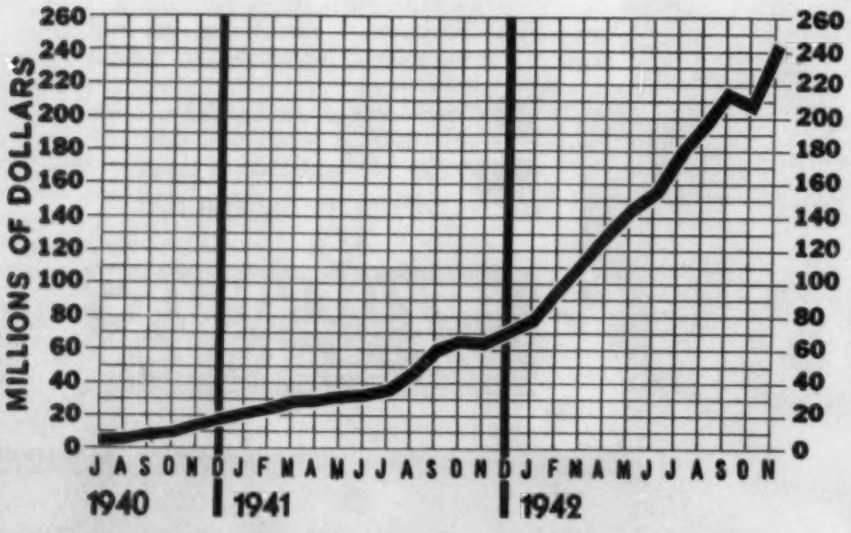
In this respect there is still another important factor in connection with our educational system in this country. That is the political psychology of our teachers. It will be recalled that not many years ago industrialists were much disturbed over the bolshevistic dogma which many teachers were planting in the minds of our youth. There was an epidemic of radicalism during which the youth of our country would go home from school and regale their parents with demands for the sovietization of this country. Business men told each other how worried they were because of the shocking things their sons and daughters were saying.

### Public's Attitude Changing

In recent years there has been a great revulsion from this type of thinking and in particular in the ranks of the educators. It was quite clear from the proceedings at the recent War Congress of American Industry that manufacturers for the first time feel that they have made real progress in the court of public opinion and particularly among our educators. On Dec. 3, in discussing the public relations work of the National Association of Manufacturers, Walter B. Weisenburger, the association's executive vice president, declared that the point now had been reached where the idea of free enterprise has been sold to the public and that what is necessary now is to sell the right kind of free enterprise. It is not Communism that now must be fought, he said, but various nostrums about "modified" enterprise.

"Not so long ago", he said, "the newspaper *PM* devoted four pages to a futile attempt to create class warfare—the Communists' familiar weapon—between the National Industrial Information Committee program and the thousands of educators who have turned voluntarily, through their association, to us for a better understanding of in-

WAR SPENDING—JULY, 1940, TO NOVEMBER, 1942




EXPENDITURES for war purposes by the United States in the first 11 months this year totaled $46,075,000,000, compared with $11,929,000,000 in the comparable 1941 period. November spending was $6,112,000,000, an increase of $390,000,000 or 6.8 per cent over October

dustry. The so-called Liberals would deny us the privilege of asking that our coming generations find out what America is all about."

This is perhaps the strongest statement yet made by a competent industrial spokesman as to progress so far made against the strong leftist trend over the past decade. Hence it remains to be seen whether Mrs. Roosevelt's plan of free education works out. Certain it is that the shape of our state to come is being worked out to a large extent right now in our educational institutions. This is one important reason why all in industry who appreciate the advantages that go with a job in private industry should keep carefully informed on everything that has to do with education.

## Restrictions on Use of Tin in Cans Tightened

Extent to which critical materials such as tin and steel can be used for cans during 1943 has been set forth by WPB in an amendment to Order M-81. Amendment (1) limits the use of tin plate, terne plate and black plate for packing food and nonfood products in cans; (2) specifies the can sizes which may be used for each product; and (3) establishes packing quotas for all items covered.

Order does not differ substantially from provisions of M-81 as they have operated during the past year. Generally, these provisions have been tightened up and have been made more inclusive to accomplish the primary objective of conserving tin, steel and rubber used in the can industry.

Major changes are:

1. Tin plate, terne plate and black plate are prohibited for packing a number of products previously put in cans made of those critical materials.

2. Many other canned products which previously could be packed in metal cans for both military and civilian use are now limited for government purchase only.

3. A few products are added to the list of items permitted to be packed in cans.

4. Some quota restrictions are lifted and others are sharply curtailed.

5. A number of can sizes are eliminated for specified products in fulfillment of the policy that odd size and intermediate type containers not be used in the interests of efficiency and conservation.

6. Tin plate coating specifications are reduced for several products, with increasing emphasis on chemically treated black plate and electrolytic tin plate, both of which result in the conservation of tin.

# Steel Products Advisory Groups Revamped; Personnel Completed

TWELVE individual steel products advisory committees have been organized or revamped as a part of the realignment of the WPB Steel Division. These will work with the overall Steel Products Advisory Committee (STEEL, Dec. 14, p. 49).

Committees include:

**Tool Steel**

J. H. Parker, Carpenter Steel Co., St. Louis; William A. Givens, Allegheny Ludlum Steel Corp., Pittsburgh; A. T. Galbraith, Crucible Steel Co. of America, New York; M. W. Saxman Jr., Latrobe Electric Steel Co., Latrobe, Pa.; J. O. Rinek, Universal Electric Steel Co., Bridgeville, Pa.; A. T. Clarage, Columbian Tool Steel Co., Chicago.

**Tin Plate**

J. A. Henry, Weirton Steel Co., Weirton, W. Va.; G. E. Totten, Carnegie-Illinois Steel Corp., Pittsburgh; B. F. McMahon, Bethlehem Steel Co., Bethlehem, Pa.; A. M. Long, Youngstown Sheet & Tube Co., Youngstown, O.; N. B. Randolph, Granite City Steel Co., Granite City, Ill.; L. Irvine, Wheeling Steel Corp., Wheeling, W. Va.

**Cold-Finished Bars**

L. M. Parsons, Jones & Laughlin Steel Corp., Pittsburgh; R. E. Fitsimons, Fitsimons Steel Co., Youngstown, O.; Fred Young, Republic Steel Corp., Cleveland; Tracy Manville, Columbia Steel & Shafting Co., Pittsburgh; J. Somers, Wyckoff Drawn Steel Co., Pittsburgh; Walter Howell, Bliss & Laughlin Inc., Chicago.

**Plates and Shapes**

Paul Mackall, Bethlehem Steel Co., Bethlehem, Pa.; Malcolm Farmer, Phoenix Iron Co., Phoenixville, Pa.; W. W. Smith, Inland Steel Co., Chicago; F. H. Gordon, Lukens Steel Co., Coatesville, Pa.; A. H. Warren Jr., Carnegie-Illinois Steel Corp., Pittsburgh; W. S. Haring, Alan Wood Steel Co., Conshohocken, Pa.

**Stainless**

R. M. Allen, Allegheny Ludlum Steel Corp., Pittsburgh; C. E. Tuttle, Rustless Iron & Steel Co., Baltimore; P. F. Voigt, Carnegie-Illinois Steel Corp., Pittsburgh; D. B. Carson, Sharon Steel Co., Sharon, Pa.; R. E. Christie, Crucible Steel Co. of America, New York; Clyde Roberts, Republic Steel Corp., Massillon, O.

**Alloy Bars and Semifinished**

N. J. Clarke, Republic Steel Corp., Cleveland; Wm. Gibbons, Carnegie-Illinois Steel Corp., Chicago; R. E. Tucker, Bethlehem Steel Co., Bethlehem, Pa.; W. B. Moore, Timken Roller Bearing Co., Canton, O.; Sidney Williams, Copperweld Steel Co., Warren, O.; Otto Seidenbecker, Wisconsin Steel Co., Chicago.

**Sheets and Strip**

W. W. Sebald, American Rolling Mill Co., Chicago; E. L. Westein, Great Lakes Steel Corp., Detroit; H. E. Robinson, Jones & Laughlin Steel Corp., Pittsburgh; B. J. Wilner, Inland Steel Co., Chicago; J. P. Hosack, Mahoning Valley Steel Co., Niles, O.; R. C. Garlick, Sharon Steel Co., Sharon, Pa.

**Pipe**

W. E. Watson, Youngstown Sheet & Tube Co., Youngstown, O.; W. F. McConnor, National Tube Co., Pittsburgh; Geo. Clifford, Spang-Chalfant Inc., Pittsburgh; D. V. Sawhill, Mercer Tube & Mfg. Co., Butler, Pa.; E. A. Buxton, Bethlehem Steel Co., Bethlehem, Pa.; John Anderson, Jones & Laughlin Steel Corp., Pittsburgh.

**Rails and Accessories**

A. C. Roeth, Inland Steel Co., Chicago; J. C. Dilworth, Carnegie-Illinois Steel Corp., Pittsburgh; N. V. Orr, Colorado Fuel & Iron Co., Denver; J. W. Murphy, Bethlehem Steel Co., Bethlehem, Pa.; H. D. Scott, Wheeling Steel Corp., Wheeling, W. Va.; J. M. Mulholland, Youngstown Sheet & Tube Co., Youngstown, O.

**Wire**

John Neudorfer, Wheeling Steel Corp., Wheeling, W. Va.; John May, American Steel & Wire Co., Cleveland; Henry A. Roemer, Pittsburgh Steel Co., Pittsburgh; W. H. Gardner, Keystone Steel & Wire Co., Peoria, Ill.; Jack Distler, Republic Steel Corp., Chicago; Carl Collins, Wickwire Spencer Steel Co., New York.

**Carbon Bars and Semifinished**

Avery Adams, United States Steel Corp., Pittsburgh; R. W. Hull, Republic Steel Corp., Cleveland; L. R. Steuer, Bethlehem Steel Co., Bethlehem, Pa.; M. E. O'Brien, Inland Steel Co., Chicago; J. W. Robinson, Jones & Laughlin Steel Corp., Pittsburgh; W. W. Brown, Atlantic Steel Co., Atlanta, Ga.

**Tubing**

Isaac Harter, Babcock & Wilcox Tube Co., Barberton, O.; L. L. Brundred, Spang Chalfant Inc., Pittsburgh; S. L. Gabel, Superior Tube Co., Norristown, Pa.; J. A. Ireland, Republic Steel Corp., Cleveland; D. T. Marvel, National Tube Co., Ellwood City, Pa.; E. Q. Smith, Bundy Tubing Co., Detroit; William Taggart, Timken Roller Bearing Co., Canton, O.; Aaron Waines Jr., Ohio Seamless Tube Co., Shelby, O.

## Liberalize Restrictions on Special Cutting Tools

A purchaser may obtain preferential delivery of certain special cutting tools up to the lowest quantity that can be efficiently produced by the manufacturer, according to a provision of General Preference Order E-2-b, as amended.

A provision in the original order restricted the purchaser to three sets of special cutting tools. The present amendment changes this limitation by providing that the purchaser may accept deliveries of the "producer's minimum practicable manufacturing quantity." Where the quantity is less than three sets of special tools, the purchase may be extended to this amount. In no event, however, can the purchaser obtain more than a 90-day inventory.

Amendment is designed to overcome certain minor difficulties which developed in operating under the original order. Among the changes made are:

A provision that frees purchasers of cutting tools from the necessity of filing an endorsement, where they are delivered with a larger machine to make it usable and are acquired under an authorized purchase order.

A provision that makes hard alloy blanks or tips subject to the provisions of the original order, whether or not attached to a tool shank.

# WPB Establishes Control Over Electric-Furnace Carbon Steel

COMPLETE control over the production and delivery of carbon steel made in electric furnaces has been established in amended Conservation Order M-21-a.

Because of the shortage of electric furnace capacity, which supplies a large part of alloy steel production, it has become necessary to control more closely the amount of carbon steel made in such furnaces.

Amended order requires producers of alloy iron and alloy steel and producers of electric furnace carbon steel to submit their melting and delivery schedules to WPB for approval. Producers may not melt or deliver alloy iron, alloy steel or electric furnace steel before such approval is granted.

At the same time, two related steps were taken by WPB:

1. A new order, M-21h, was issued establishing control of the production of carbon and alloy tool steels. Formerly, tool steel production was regulated by orders M-21-a and M-14.

2. Provisions formerly contained in M-21-a relating to tool steel, and the entire order M-14 were revoked, making M-21-h the only order controlling tool steel production.

Under this order, producers of all tool steels must submit their melting and delivery schedules for the approval of the Director General for Operations. The M-21-h order is expected to effect considerable conservation of scarce alloying elements such as molybdenum, tungsten and vanadium, as a result of maximum limitations which are placed on the alloy content of high-speed steel.

In addition, as a further step to conserve molybdenum, the order restricts monthly production of certain high molybdenum type steels to 30 per cent of the monthly average tonnages melted during the second quarter of 1942. Delivery of these tool steels is limited to 75 per cent of the same base period in the fourth quarter of 1942, and to 35 per cent in the first quarter next year.

Old restrictions of M-14 providing that 75 per cent of all high-speed steel orders accepted in any one quarter be molybdenum types, and not more than 25 per cent tungsten type, are continued by the new order.

# Combined Committee Established By U. S., United Kingdom, Canada

THE United States, United Kingdom and Canada last week acted to pool all steelmaking and munitions manufacturing facilities of the three countries into a single unit designed to produce the maximum of weapons for the defeat of the enemy.

The pool will be accomplished through the establishment of a Combined Steel Committee, appointed by the Combined Production and Resources Board and the Combined Raw Materials Board.

Hiland G. Batcheller, chief, WPB Steel Division, is chairman of the committee. He will be assisted by a staff of American, British and Canadian production experts.

Creation of the committee followed a visit made by a United States steel mission to the United Kingdom under the auspices of the Combined Production and Resources Board. The mission brought to light many differences in the production and use of steel in the United States and the United Kingdom, and reported that greater production could be obtained by pooling technical information, production methods and distributing methods. Instructions given to the committee are:

1—To obtain, assemble and co-ordinate information on iron ore and scrap, iron and steel production and requirements of iron and steel of the United Nations in such form as will enable the supply and requirements position to be kept continuously under review by both boards.

2—To consider and make recommendations on the means of increasing production and improving the efficiency of the use of steel and distribution facilities in the United Nations including facilitating the exchange of technical information, information on trade practices and on measure of conservation and limitation of use.

3—To consider and make recommendations on unified systems of definitions and terminology.

4—To undertake such special inquiries as may be directed by either board.

5—To recommend as necessary any action which should be taken by either Board to adjust supplies and requirements to one another.

Full membership of the Combined Steel Committee, which will work in Washington, will be:

Mr. Batcheller, United States, chairman, acting for combined Production and Resources Board.

Geoffrey Crowther, United Kingdom, Combined Production and Resources Board.

M. O. Heller, United States, Office of Program, vice chairman, War Production Board.

Maj. E. W. Senior, United Kingdom, British Ministry of Production.

Douglas Campbell, United Kingdom, Combined Raw Materials Board.

Paul Homan, United States, Combined Raw Materials Board.

D. B. Collyer, Canada, Canadian Department of Munitions and Supply.

## Control Over Cobalt Tightened by WPB

Cobalt has been placed under tighter control by WPB in General Preference Order M-39, as revised.

Revised order, in effect, is a consolidation of the terms of the previous M-39 regulations and of M-39-b, which curtailed the use of cobalt in certain specific items. The latter order is revoked.

Under the new regulations, cobalt is subject to complete allocation, except for quantities of 25 pounds or less which may be delivered during any one month to any consumer without specific authorization. Previously, 50 pounds could be delivered monthly without specific authorization.

The list of products for which cobalt may be used has been re-grouped to restrict further the use of cobalt in protective coatings, in nonferrous alloys and in ground coat frit (necessary for enameled steels).

Permitted uses are now: Catalysts; cattle and plant food; decolorizer for glass, but not in excess of one pound of cobalt element per 100 tons of glass; driers for floor and deck paints, varnishes, interior trim enamel, and printing ink; ground coat frit on orders rated AA-4 or higher; health supplies; high-speed steels; laboratory and research equipment; magnets; nonferrous alloys on orders rated AA-5 or higher; and in pigment for glass for optical and safety purposes.

# Ten "Thinkers for Victory" Given Production Awards by F. D. R.

TEN war workers who contributed ideas to save time and materials and to expedite production recently were given high War Production Drive awards by President Roosevelt at the White House.

The group later was honored at a luncheon attended by high WPB and military and naval leaders. WPB Chairman Donald M. Nelson, in an address that was broadcast to hundreds of war plants, said that new ideas on production, springing from the mechanical genius of the man at the machine, will become even more important during the coming year in expanding output of war goods.

Dean of the "production for victory thinkers" was Joseph H. Kautsky, 65-year-old machinist for Link-Belt Co., Indianapolis. Mr. Kautsky was awarded a Citation of Individual Production Merit for four technical suggestions for increasing the effectiveness of precision grinding machines in war plants throughout the country.

Five others won Citations:

Clinton R. Hanna, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., for suggesting a method of increasing the effectiveness of Army tanks which the Army has described as "outstanding."

Edwin Curtiss Tracy, RCA Mfg. Co., Camden, N. J., for suggesting a new testing instrument for checking certain flight instruments without removing them from plane, thus reducing time required.

Madison E. Butler, Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y., for developing visual lamp indicator to test field telephone switchboards used by the Army Signal Corps.

James A. Merrill, Goodyear Tire & Rubber Co., Akron, O., for contributions in the development of self-sealing airplane fuel tanks.

Walter P. Hill, Hecla Consolidated Copper Co., Detroit, for development of a spun-end primer for ammunition primer, effecting a saving of metal, greater production and lower production costs.

Four other workers received Certificates of Individual Production Merit. They were:

George Smolarek, Packard Motor Car Co., Detroit, for devising method whereby a three-step drilled hole is drilled in one operation.

Daniel Mallett, Borg-Warner Corp., Rockford, Ill., for suggestion to rough and finish turn fuse bodies by using a stub arbor and live center tail stock with tank driven fixture.

Herbert Rudolph James, National Tube Co., McKeesport, Pa., for a multiple torch arrangement for brazing tool tips to tool shanks.

Stanley Crawford, RCA Mfg. Co., Camden, N. J., for calipers designed for determining the wall thickness and relationship between cored interior and outside surface of castings.

*Standing behind the President after receiving their War Production Drive awards are: Herbert R. James, McKeesport, Pa.; George Smolarek, Detroit; Walter P. Hill, Detroit; William G. Marshall, director of War Production Board Drive committee; Edwin C. Tracy, Camden, N. J.; Clinton R. Hanna, East Pittsburgh, Pa.; Stanley Crawford, Camden, N. J.; Daniel Mallet, Rockford, Ill.; Joseph H. Kautsky, Indianapolis; James A. Merrill, Akron, O.; Donald M. Nelson, WPB chairman; Madison E. Butler, Rochester, N. Y. NEA photo*

## Bethlehem Steel Commended By Ickes for Co-operation

Bethlehem Steel Co. was commended last week by Secretary Ickes for its work in manufacturing needed equipment for the Midwest 24-inch oil pipe line. Mr. Ickes said his remarks at a recent press conference had been interpreted to imply criticism of Bethlehem's wartime co-operation with the government, but no such criticism was intended.

"Bethlehem Steel has co-operated splendidly with us in meeting this emergency requirement; so well, in fact, that I am now told the necessary equipment will be fabricated in a matter of several weeks in advance of the date previously set," Mr. Ickes said.

## Give War Bonds as Rewards In Time Clock Competition

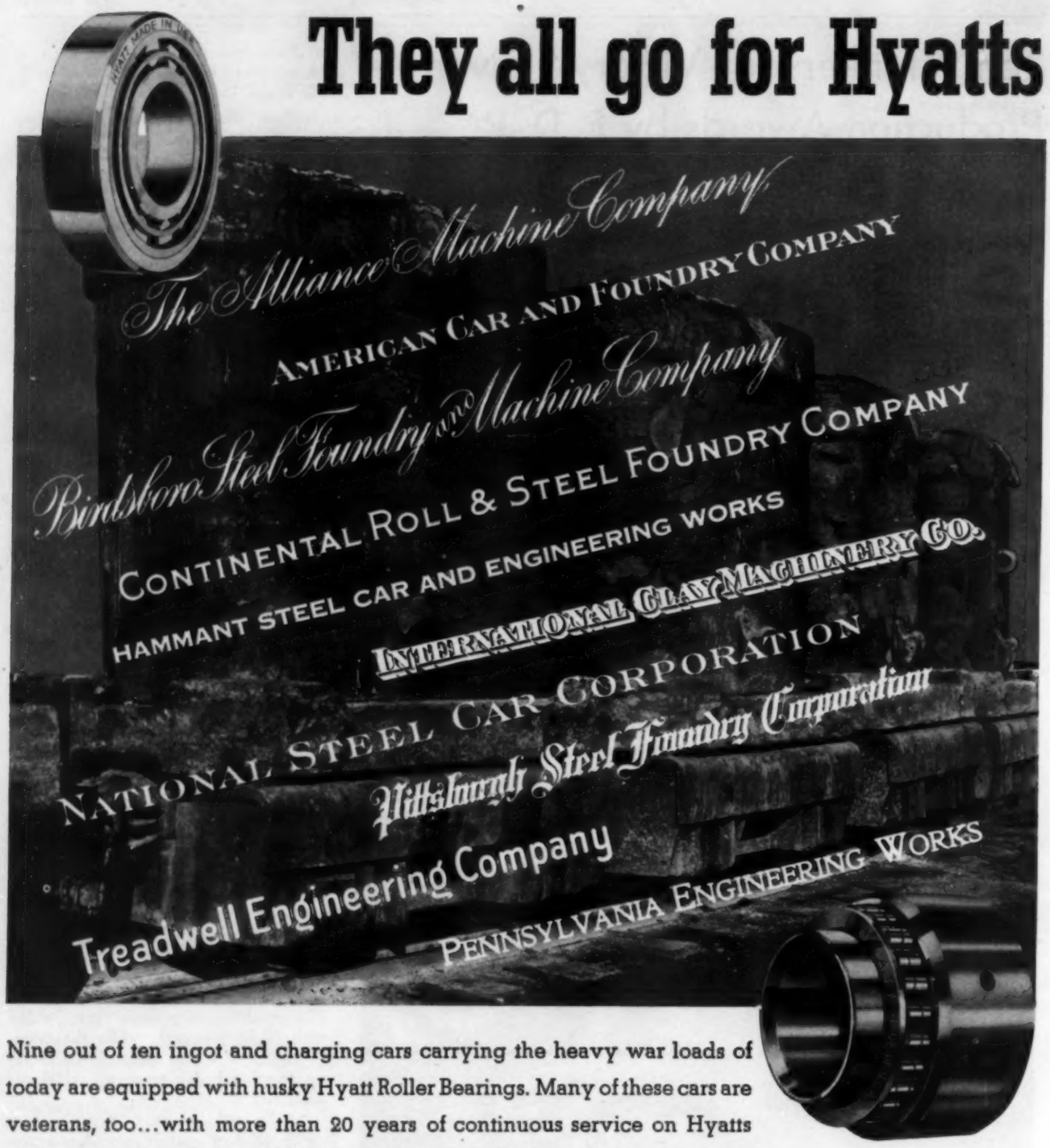
To reduce absenteeism, the Marine Machinery Manufacturing plant of Webster-Brinkley Co., Seattle, instituted a monthly "time clock" competition.

Twenty-five dollar War Bonds were given to each member of the winning department, which, in November, was the assembly division which scored an attendance record of 95.15 per cent. The machine shop was close behind with 95.09 per cent, while the warehouse, foundry and maintenance workers together had a record of 92.08 per cent.

In the entire plant, 63.8 per cent of employes had perfect attendance records. The three top winners in the individual contest were awarded $100, $75, and $50 War Bonds respectively.

The second Convention of Production and Commerce, held recently at Santiago, Chile, recommended stimulation of the mining industry, particularly asbestos, mica and bauxite. According to unofficial reports to the Department of Commerce it was proposed to make credits available to mines, provide economical means of transportation and facilitate technical aid and equipment. Increased funds were recommended for research studies in smelting of low-grade ores.

# They all go for Hyatts


The Alliance Machine Company
American Car and Foundry Company
Birdsboro Steel Foundry and Machine Company
Continental Roll & Steel Foundry Company
Hammant Steel Car and Engineering Works
International Clay Machinery Co.
National Steel Car Corporation
Pittsburgh Steel Foundry Corporation
Treadwell Engineering Company
Pennsylvania Engineering Works

Nine out of ten ingot and charging cars carrying the heavy war loads of today are equipped with husky Hyatt Roller Bearings. Many of these cars are veterans, too...with more than 20 years of continuous service on Hyatts *without bearing replacement.* Some of the car builders listed above started using Hyatts more than thirty years ago. That Hyatts have done their job well is evidenced by the fact they are still serving...and that practically all other builders have since built with Hyatts. To keep your cars on the go, play safe and specify Hyatts for all new equipment and change-overs. Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.

**THE 50TH YEAR OF HYATT ROLLER BEARINGS**

By A. H. ALLEN Detroit Editor, STEEL

# MIRRORS of MOTORDOM

***Idle Army trucks loaned to postal authorities for holiday rush. . Detroit, with 330,000 added population, feels pinch in food, housing, fuel and other civilian supplies***

*DETROIT*

ONE nice thing about having thousands of Army trucks lined up in fields here awaiting transfer to Army camps or abroad is that they have been able to ease the critical shortage of trucks in the post office department occasioned by the holiday rush. Several hundred of the large Army transports have been loaned to postal authorities who have been hard pressed to keep the flood of Christmas mail and packages moving. Early last week the postmaster here sent out frantic calls for even more assistance in moving mail, stating that he was from 24 to 36 hours behind schedule.

Population in the Detroit area has increased an estimated 330,000 since 1940, or about 13 per cent, a factor which has not been recognized in such things as rationing, transportation, etc., where old population figures were used. The result has been a deplorable situation in supplies of meat and foodstuffs, housing, oil for heating, and all civilian services in general.

Meat in particular has been a critical item. Detroit packers completed their quota for the fourth quarter early this month and can do nothing to ease the choked demand for meat until after the first of the year. On top of this, the low price ceilings applied to wholesale meat cuts in the Detroit area (butchers say Detroit has always been a "slum" town for meat as far as price is concerned) have forced the large Chicago packers to short-circuit Detroit and send their meat to cities with higher price ceilings, such as New York and Boston. A change to uniform price ceilings throughout all cities might correct this trouble.

Butter is also virtually disappearing from retail stores and there are scant prospects of any relief in this commodity before spring. One merchant says this difficulty was caused by the government freeze order on warehouse stocks of butter which was issued Nov. 28, but was effective as of Nov. 1. Thus if a cold storage house had 60 per cent of its 100,000 pounds of butter frozen as of Nov. 1, but in the meantime had disposed of 30,000 pounds, it would still have to set aside 60,000 pounds for the government, leaving only 10,000 pounds for immediate distribution. And there is practically no "new" butter produced during winter months, so the outlook for better supplies is dark, particularly when it is realized that thousands are now buying butter who may have never used it before, simply because their earnings are at a record high point, and further that Detroit has many thousands of newcomers working here who must be fed.

It is too early to get any clear effect of gasoline rationing on industrial Detroit. All gas tanks were filled to the brim Nov. 30, and most drivers are just getting into their A-books now. Local ration boards were inclined to be generous with requests for supplemental mileage, and in many cases where plant officials took charge of such requests from their employes nearly everyone was given a C-card, tailored to whatever mileage was requested.

**Use Anything That Runs**

The city-owned transportation system currently has just about every piece of equipment it owns, 3000 buses and street cars, in service and traffic now is 44 per cent above a year ago. This is expected to go to 50 per cent after Jan. 1, but is complicated by a serious shortage of motormen, conductors and bus operators. First women conductors made their appearance a week or so ago. Daily traffic on buses and street cars is close to 2,000,000 persons. One bus line reports a 100 per cent increase in the first 13 days of December over a year ago.

Parking lot business has fallen off about 40 per cent. There has been little effect other than seasonal on church and theater attendance. Department stores are about 20 per cent ahead of last year in dollar volume of business, 7 per cent ahead in number of transactions.

Maj.-Gen. Levin H. Campbell's "fluidity of war" phrase in STEEL, Dec. 14, was explained to newsmen here briefly as the general passed through Detroit and visited the Tank-Automotive Center here recently. He pointed out that, with ordnance now giving way to aircraft and ships, cuts in production schedules could be expected, but that they would not be serious and were being made mostly in forward schedules and not those now in force. He estimated that 1943 ordnance production would continue about at the present level, with no further increase likely unless the "fluidity of war" made acceleration necessary.

As an example of this fluidity, he mentioned the case of an 81-millimeter mortar which was being supplied armed forces in the Solomons. Reports from the field indicated this weapon was a little heavy to be moved about easily, and recommended a lighter mortar. Immediately production of a smaller mortar was stepped up, and that of the 81-

## "SWAMP BUGGY" NOW MILITARY CARRIER

**AMPHIBIAN tractor, now in service in the Solomon Islands, takes Detroit press group on a test run in the Detroit river. A. H. Allen, STEEL's Detroit editor is in background, with arm extended. The 9-ton all-welded steel tractor will carry 24 fully-equipped troops, makes 25 miles an hour on land, 12 knots in the water. Designed by the Roeblings originally for emergency service in Florida, the "swamp buggy" is being built by several manufacturers, including Graham-Paige Motors at Detroit (Mirrors of Motordom, Dec. 7)**

millimeter was substantially reduced.

General Campbell said it should be remembered that ordnance production has been expanded 71,000 per cent in dollar volume in the last two years, and he produced a 40-foot chart to prove it, this length being needed to accommodate the 1942 total which was plotted against years preceding. This terrific expansion was occasioned principally by the rush to cover basic requirements, but it at once created the danger of "running away from the materials situation", as the general expressed it.

Reductions now being made and those to come will affect primarily the large integrated producers and government arsenals, General Campbell said, for the reason that the Ordnance Department is "bending over backward" to keep the small businessman going on government contracts. For purposes of public consumption this policy is admirable, but anyone connected with industry knows that it is impossible to cut schedules of the large contractors without affecting a host of small businesses, since the larger manufacturers, in war even more than in peace, have fanned out their needs over hundreds of small companies.

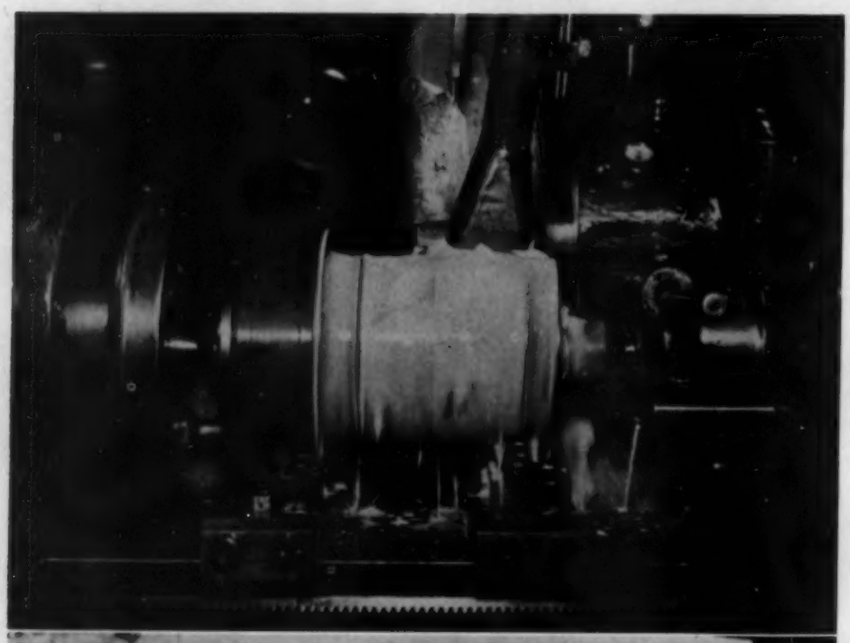
### Navy Program Fixed

It is hoped that reductions in ordnance schedules can be filled in by contracts for other branches of the armed forces—the Navy and Air Forces. In theory this would work out fine, but the Navy, for example, has long ago placed its principal contracts and at the moment is not looking for new sources because its established construction program has not been expanded other than for aircraft.

As a matter of fact, some of the large companies producing ordnance in this area have been scouting around to see if there were some Navy contracts which could be undertaken as "fill-in", but they are not having much luck.

It has been announced officially by Brig.-Gen. A. R. Glancy, deputy chief of ordnance, that a decision has been reached on one engine which will be installed in the majority of medium tanks now in production. This engine was discussed briefly in STEEL, Nov. 28, p. 50. General Glancy hastened to add that this does not mean the one type of engine will be used exclusively since the exigencies of warfare and demands of specific countries make it necessary to continue using other types for a limited number of medium tanks.

Buick has completed shipments on its first two contracts for bomber engines for the Army Air Forces, and other supply contracts now in force have been boosted substantially with the result that expanding operations will call for production schedules nine times larger than those for which plant and equipment were planned originally. The new Buick aluminum foundry, supplying cast cylinder heads for the Pratt & Whitney engine built in Flint and Chicago plants, will be expanded correspondingly to meet boosted requirements for engines. The latter expansion involves principally the installation of melting furnaces to make up the proper alloy for casting, since metal sources are reported unable to meet the increased demand for aluminum. The foundry will buy a "double-rich" aluminum pig and then alloy it suitably for subsequent casting, it is understood.



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**LIQUID-cooled arbor, developed by engineers of Ford Motor Co., has brought about a reduction from 90 to 20 minutes in the time required for grinding the thin-walled alloy steel cylinder barrel used in Ford-built Pratt & Whitney radial aircraft engines. Lower view shows arbor with orifices through which coolant is pumped at 1-pound pressure, cylinder barrel before and after grinding, and centers on which the arbors are mounted. Top view shows the grinding operation, with coolant pouring over outside of barrel and draining from inside barrel in stream at right. Coolant enters perforated arbor through point of one center, drains through hole in shank of center at opposite end, minimizing danger of warping and thus speeding up grinding operation**

**And Ever Since, More and More Independents Have Been Supplying Oxygen for Our Fighting Forces**

# Now on the World Battle Fronts

*Pioneering* developments carried on by *Independent* Engineers . . . exhaustive first-hand study in foreign lands—long before war clouds gathered . . . made it possible for this organization to design and produce these engines for war . . . now serving wherever oxygen is needed to "keep 'em flying" . . . solving a vital problem in logistics.

This is but *one* of *Independent's* many "FIRSTS" to help the war cause—watch for the news of others.

**Uncle Sam NEEDS Experienced Men to Operate These Machines**

**If you know of anyone now in the service, or scheduled to be, who has had oxygen or hydrogen producing plant experience, suggest that they investigate the opportunities in serving their country in this field. Those in service consult with their superiors—those entering service should consult with their local recruiting office.**

*If further details are wanted, we will be glad to supply them — address*

## Independent Engineering Co.

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# WING TIPS

***United States Air Force adopting heavier firepower for both bombers and fighters. Twenty and 37-millimeter cannon next logical step to increase effectiveness***

COMBAT airplanes, whether large bomber or small pursuit ship, in the final analysis must depend for success on their firepower, their ability to "dish it out" to enemy warcraft and ground forces. Fitting of firepower to airplanes is constantly in a state of flux, but the trend is always in the direction of more and heavier guns without too much sacrifice in speed, climbing ability or range.

American fighting planes are now liberally equipped with 37-millimeter and 20-millimeter cannon and .50-caliber machine guns, while many enemy types depend on .30-caliber machine guns. One version of the Japanese Zero fighter, for example, is usually armed with two 20-millimeter low-velocity cannon and two 7.7-millimeter machine guns. Against this place the Bell P-39 Airacobra fighter, designed expressly around a 37-millimeter cannon firing high-explosive and armor-piercing projectiles through the nose, and also carrying a full complement of .50-caliber and .30-caliber wing and fuselage guns, the fuselage guns being synchronized to fire through the propeller.

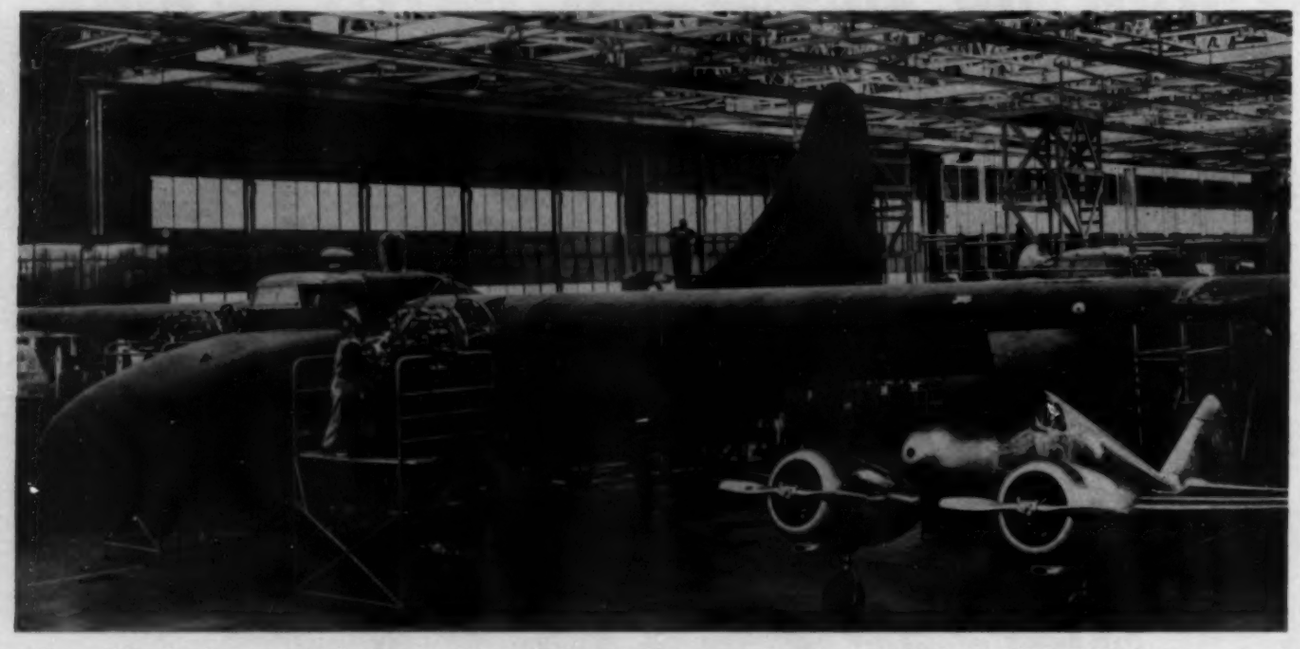
The early series of the Boeing B-17 Flying Fortresses were dependent for firepower upon .30-caliber machine guns, located one on each side in a "waist blister" in the fuselage, one in a protruding fixed "belly turret", one in a sliding port located in the fuselage top, and two in racks in the nose section. This distribution left the tail of the ship vulnerable, a defect which was quickly remedied in the B-17E and B-17F models. The old fixed belly turret was replaced by a Sperry power turret equipped with two .50-caliber machine guns. Side waist blisters disappeared in favor of removable hatches behind which are .50-caliber guns on flexible mounts. The sliding port in the top of the fuselage was displaced by another power turret mounting twin .50-caliber guns, while additional .50-caliber guns were strategically disposed.

The one-time vulnerable tail section was completely redesigned and lengthened 5 feet to include a compartment accommodating a gunner and two .50-caliber machine guns, forming a potent "stinger" which ruined a good many Jap fighter pilots not familiar with the redesign.

Pursuit planes, with multiple wing guns, now are generally being fitted with .50-caliber size instead of .30-caliber, the latter virtually disappearing as aircraft armament. Even the former seem destined for early replacement in some newer types of battleplanes, according to Lieut.-Gen. H. H. Arnold, chief of the Army Air Forces, who told graduating cadets the other day that the standard .50-caliber machine gun would "look like a pea-shooter" alongside armament newer planes will carry.

The next logical step is to the 20-millimeter (equivalent to about .80-caliber) cannon, which has been in production for some months for aircraft installations. The 37-millimeter cannon, identical in size with one of the Army's standard antitank guns, and the

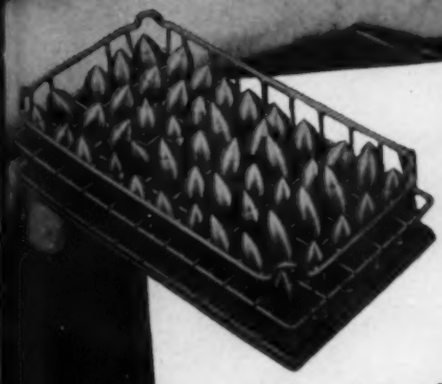
## FIRST AMERICAN TRANSPORT PLANE (MAINLY WOOD) TO BE DESIGNED DURING WAR



Pictured for the first time is the first American transport plane to be designed during this war, the giant, new Curtiss (C-76) Caravan now nearing completion and shortly to be flight tested. Designed by Curtiss-Wright Corp., to be built almost entirely of wood and other non-strategic materials and scheduled to be used by the United States Army Air Forces in speeding troops and other vital military cargo to widely scattered war fronts, it is the first wood military cargo plane to be developed. Note how it towers over the twin-engined Curtiss (AT-9) Jeep beneath the wing in the foreground.

The new "air freighter" is a high-wing monoplane, has a wing span of 108 feet, is 68 feet long and is powered with two 1200-horsepower engines. No details on performance or capacity have been released. It is the second transport type to be put in production this year by Curtiss-Wright Corp., the other being the all-metal Curtiss (C-46) Commando, world's largest twin-engined airliner. Passed by War Department.

# A.P. SHELLS-260 MORE PER TOOL GRIND'



# SUNICUT 209

## "BOOSTS 37MM. SHELL PRODUCTION"

Production of 37mm. armor-piercing shells at this metal-working plant was hindered by short tool life . . . until a Sun Doctor of Industry diagnosed the trouble and recommended a change in cutting fluid — to Sunicut 209.

On the circular forming operation Sunicut 209 increased tool life by more than five times! On other operations it likewise effected a substantial improvement.

Another advantage of Sunicut 209 that operators were quick to appreciate was its transparency — permitting a clear view of tools and work at all times, easy micrometer readings, greater accuracy, fewer rejects.

Sun Engineers and Sunicut have been rendering production-boosting service like this since long before Pearl Harbor. Today . . . in your own plant . . . whatever your metal-working problem . . . they can help you. For helpful examples of how they are helping others, write for your copy of the booklet "Helping Industry Help America."

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# SUN PETROLEUM PRODUCTS HELPING INDUSTRY HELP AMERICA

Bofors 40-millimeter gun are other possibilities which suggest themselves for aircraft installation. One of the principal problems incident to shouldering heavier guns on aircraft is the matter of absorbing recoil. As planes grow larger and heavier, this problem is not so tough, but it still calls for some clever engineering.

### Spreads Engine Production

Pratt & Whitney has reported on some phases of its tremendous job in helping six licensees to tool up for production of Wasp radial engines, a task now virtually completed. In the last 27 months, the licensor has supplied to Ford, Buick, Chevrolet, Nash, Jacobs and Continental in training and manpower assistance the equivalent of 41,666 man-days. And to eliminate bottlenecks caused by temporary shortages in licensee plants, Pratt & Whitney in the same period has diverted from its own supply and furnished to licensees better than $500,000 worth of engine parts. In the past few months, as licensees came into production, they have reversed the process and supplied to the engine's parent parts valued in excess of $100,000.

Small tools and large machines were "loaned" or diverted to licensee and subcontractors' plants. Some machines, weighing up to 5 tons apiece, were pulled from the production line at East Hartford, Conn., and trucked to the midwest when deliveries fell behind promises at one licensee's plant. This required hasty rearranging of the East Hartford lines to avoid a drop in production. Large quantities of small parts were shipped by train and airplane often within 24 hours of an urgent request for them.

Now, with licensees reciprocating, some material is moving back to East Hartford. One plant is supplying crankshafts daily. Another has furnished 25,000 pistons, still another 20,000 cylinder heads, etc.

### Six-Blade Propeller

The Curtiss six-blade dual rotation propeller (*Wing Tips*, Oct. 26, p. 46), developed by the Propeller Division of Curtiss-Wright Corp., is claimed to be the first in the world to be built around the principle of electric control of the pitch of hollow steel blades, and was designed specifically for use in connection with high-horsepower engines.

The dual rotation or counter-rotating, propeller comprises two three-blade units mounted one behind the other on coaxial shafts so that three blades rotate in one direction and the other three in the opposite direction. Spacing between the two sets is small, being only 1½ times the maximum width of the blades, necessary to permit changing blade pitch.

A single pitch-change motor is mounted on the larger of the two concentric shafts, and is connected to the blades of both propellers by means of suitable gearing. The gearing is designed so that the pitch angle of both propellers is perfectly synchronized to divide the power equally between the two sets of propellers throughout the speed range of the airplane.

Five important advantages are listed for the dual rotation propeller:

1. It eliminates the torque, or twist effect, of a single propeller, greatly improving lateral and directional control in single-engine high-powered ships under both slow and high speed conditions. The elimination of the rotational component of the slipstream has the further advantage that directional trim does not change with power on, or power off, as is the case with single rotation props.
2. More blade area is provided, a needed feature in airplanes designed for high altitude operations.
3. Propeller efficiency is increased by approximately 5 per cent for high-speed ships.
4. For a given installation, the dual

## AVIATION LEADERS MEET TO PLAN WAR PRODUCTION

DISTINGUISHED group of aviation industry leaders present at meeting of Aircraft War Production Council, East Coast, held recently at plant of Republic Aviation Corp., Farmingdale, N. Y. Left to right, R. S. Damon, Republic; R. W. Miller, Republic; Guy Vaughan, Curtiss-Wright; J. Carleton Ward, Fairchild; Glenn L. Martin; Lawrence E. Bell, Bell Aircraft; C. Hart Miller, Republic; E. C. Goad, Eastern Aircraft Division of General Motors; Miss Scanlan, Council secretary; Victor Emanuel, Aviation Corp.; S. A. McClellan, Ranger; Col. H. B. Nichols; Lieut. O. Phipps, Navy; Alfred Marchev, Republic; Harold Budds, Ranger; C. A. VanDeusen, Brewster; Sherman Jenney, Navy; E. L. Zivi, Glenn Martin; and W. Wallace Kellett, Republic Aviation Corp.

*Information supplied by an Industrial publication*

In cleaning lathes it is common practice to brush chips, dust, and dirt off lathe ways and surfaces, spindle threads, and other obvious places.

There are other parts where cleaning is equally important, but that are likely to be overlooked. One is the lead screw, and the other is the interior threads in the chuck or face plate back.

The former can be effectively cleaned by holding a cord, or piece of twine of suitable diameter in the thread groove, and pulling the ends back and forth as the screw revolves. The motion is similar to that used in polishing shoes.

Interior threads can be cleaned by a simple tool made out of a piece of heavy steel wire. The wire is bent into a loop, with the ends bent at right angles. The tool works better if the ends are filed to the V-shape of the threads, the spring in the loop will hold the ends tightly in the thread grooves.

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rotation prop is smaller in diameter than a single rotation design, thus making possible a number of economies such as lighter landing gear, etc.

5. Engine installation is simplified, as it is not necessary to provide for as much torsional deflection in engine controls and accessories as in the case of single rotation props.

### Dive at Supersonic Speed

New aerodynamic and speed frontiers were explored last month at an East Coast air base, when two Army lieutenants in Republic P-47 Thunderbolts dived these 2000-horsepower single-place fighters at 725 miles per hour, or better than 12 miles a minute and approximately the speed of sound!

The men were sent out to do horizontal speed runs at 35,000, 30,000 and 25,000 feet. When they had completed their work at the top altitude, they dived merely to reach the next level of operations more quickly, but under full power their ships reached such high speed that control surfaces were literally frozen stiff by the rushing slipstream and they were able to extricate themselves only by operating the cranks which control the elevator trim tabs.

Of his physical reactions to the terrific speed, Lieut. Harold Comstock, 22, said, "My body was pushed back against the rear armor plate, and I had a feeling that any second the plane was going to pull away from me and leave me stranded there, five miles above ground. It's a breathless feeling, your stomach curls up; it's something like stepping from a hot shower into a cold one."

Little is known about the behavior of airplanes at supersonic speeds, except that they enter a realm where the airflow spatters about the ship and sound waves begin to act on control surfaces with unpredictable results. Essential flying characteristics of a plane appear to become lost.

### A-31 Dive Bomber

For the past year the Nashville Division of Vultee Aircraft Inc. has been in production on a new single-engine two-place dive bomber for the Army, designated as the A-31, and called the VENGEANCE by the British. It is powered by a 1600-horsepower Wright double Cyclone engine, has load capacity of 2000 pounds and exceptionally long range. Armor plate protection is provided for the crew, wing guns are supplemented by twin guns mounted in the rear cockpit. Hydraulically controlled dive brakes are said to guarantee the pilot complete control over his ship in coming out of a vertical dive, and also to assist in accurate aiming of bombs.

Wing span is 48 feet, length 40 feet, height 14½ feet. All-metal construction is used, with conventional semi-monocoque fuselage and full cantilever stressed-skin wing.

Ryan Aeronautical Co. has signed contracts with the Navy for production of the SOR-1 scout-observation plane, a ship or land-based craft for long-range missions, the basic type being developed by Curtiss-Wright and known popularly as the Seagull. It carries a 12-cylinder inverted-V air-cooled Ranger engine. Ryan's contract is believed to be the largest in dollar volume ever placed with the company, an important supplier of training planes.

## DODGE CHICAGO PLANT LARGE ENOUGH TO ENCOMPASS FORD'S

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*More than 60 huge concrete forms, such as those at left, are being used on the construction of the Dodge Chicago plant. Developed by the Fuller Construction Co., general contractors, 52 of the largest are more than 120 feet long and are making possible the building of the huge structure in record time. After a cycle of seven days, during which the forms are rolled into place, set, the concrete poured and dried, they can be moved to new positions in eight minutes*

*Thirty million square feet of lumber, 1000 carloads, are being used for the concrete forms and supports during construction, right. The Dodge Chicago plant recently was described as "big enough to put the Ford Willow Run bomber plant inside and have room enough around the edges for 20 base ball diamonds"*

# Shipbuilding Program Increased; Now Near Billion Dollar Mark

*TORONTO, ONT.*

SHIPBUILDING program in Canada was increased 20 per cent in the last three months and now represents estimated total expenditure of $900,000,000, it is stated by C. D. Howe, minister of munitions and supply. He reveals that since the beginning of the war this country has launched almost 300 combat ships, including corvettes, minesweepers, patrol boats, base ships and others, as well as scores of cargo vessels. Approximately 1100 smaller craft, from lifeboats to motor torpedo boats, have been launched and more than 2000 are under construction. Building is well advanced on two Tribal class destroyers in eastern Canadian yards. The cargo shipbuilding program calls for about 300 vessels of 10,000 tons deadweight, at a cost of approximately $6,000,000. Already more than 70 of these ships have been delivered, one in only 88 days after laying the keel. The small boat program represents expenditure of about $13,000,000 and is approximately 75 per cent complete. In addition, 90 yachts and motor boats have been purchased and 20 smaller craft have been chartered. Purchase of these craft and conversion of other ships for use in the transport of essential materials represent another $8,000,000.

Under direction of the controller of ship repairs and salvage, extensive facilities for ship repairs have been provided at a cost of approximately $6,000,000. These facilities include a floating drydock, new docking space, additional machine shop buildings and tools for repair work.

Indicating the volume of materials necessary for a ship construction program of this magnitude, Mr. Howe stated that one minesweeper required 300 tons of steel shapes and plates and 25 tons of rivets for the hull alone. There are 1100 valves of various sizes, 2½ miles of piping, 32 miles of electrical wiring, 26 tons of copper and six tons of anchor chain. The time to build such a boat is 350,000 man hours. Canada's shipbuilding program is being carried out in 21 major shipyards and 58 smaller yards located on the east and west coasts, the St. Lawrence river and the Great Lakes. The personnel of Canadian shipyards exceeds 50,000 workers, with women increasing in number.

Department of Munitions and Supply announces that wrought copper and brass have been placed under direct allocation control in Canada. A new order by G. C. Bateman, metals controller, consolidates previous directives. The order also provides that a sale of 300 pounds or more must have the controller's approval, and a sale of less than 300 pounds may be made without permit, but only if it is for a purpose necessary to the war production program, public health, communications, transportation, or some other essential use defined in the order. Of the wrought copper and brass produced in

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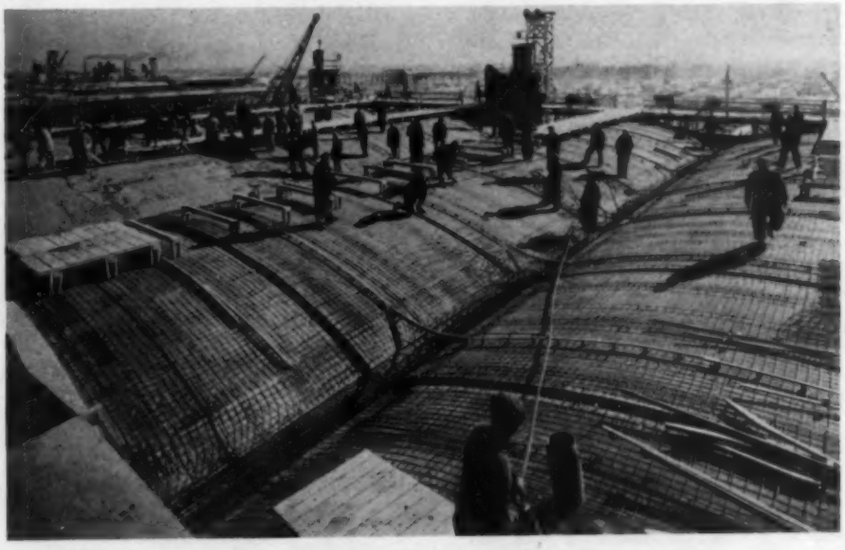
## WILLOW RUN, WITH ROOM LEFT FOR 20 BALL DIAMONDS



*One of 15 of the buildings, left, is being built from both ends at the same time. What appears to be another plant in the background really is the other end of the one in the foreground. Its roof will cover more than 50 city blocks of land and a section of 22 acres inside will be completely air conditioned. Most of the inside will be only fresh-air ventilated*

*From prairie to operations in 94 days: Tool shop is the first of the buildings completed. Using a new type of arch-rib reinforced concrete construction, the amount of steel necessary per square foot of floor area has been reduced from a customary 5.5 pounds to 2.6 pounds. By this method enough steel will be saved to build 14 destroyers or more than 600 medium tanks*

Canada more than 98 per cent is used in this country for the manufacture of shells, warplanes, ships, guns and other war supplies. Less than one per cent goes into essential civilian uses, and the small balance is divided between exports and non-essential uses.

Canadian priority branch of the Department of Munitions and Supply, has issued notice advising Canadian holders of serial numbers under United States Preference Rating Order P-100 to use the form of certification found in the order, rather than the standard form that has generally been used. By adhering to this policy they will do much to assist delivery of repairs, maintenance and operating supplies of United States origin on the A-10 rating which is assigned to them under the order.

To apply the preference rating A-10 to deliveries of materials that require priority assistance, holders of serial numbers under P-100 are instructed to endorse the following statement in their purchase orders: "Materials for Maintenance, Repair or Operating supplies—rating A-10 Under Preference Rating Order P-100 with the terms of which I am familiar." This statement to be signed as instructed in the order. The basis for this interpretation is that the War Production Board in Washington will grant special assistance to manufacturers so far as repairs, maintenance and operating supplies are concerned, in order that they may obtain raw materials for such supplies sold by the manufacturer on an A-10 rating under P-100.

### Jewelry Is Restricted

Department of Munitions and Supply announces drastic restriction on manufacture of jewelry and flatware in an order issued by Herman H. Levy, jewelry administrator in the Wartime Prices and Trade Board. Effective Dec. 10, the order provides that no jewelry may be made, other than pendants, chokers, bracelets, ear-rings, or brooches. Sterling silver and silver plated toiletware are confined to combs, brushes and mirrors. After Dec. 31, sterling or plated knives and forks of Canadian manufacture will come in one size only and spoons in three sizes. Each manufacturer of plated flatware is restricted to not more than two designs. The order also affects many luxury ornamental articles. No gold, silver or platinum may be used in such articles as presentation trowels, warden's chains, baby pins, buttons for officers' uniforms or convention badges.

A new process which provides a substitute for tin has been patented by its inventor, Alfred D. Slatkin, and his business associate, Arthur F. Cutton, both of Toronto. Mr. Slatkin states that his substitute possesses most of the qualities of tin and some advantages lacked by pure tin. The patent describes the substitute as the "industrial silver impregnation process," and the discovery is said to have aroused considerable interest in this country and the United States. The process has passed exhaustive tests. In simple terms, Mr. Slatkin stated, the process is electro-chemical and uses silver instead of tin. No plating is required. The new process places the silver in the steel, instead of on surface, thereby an unbreakable combination of two elements is created, he claims.

## Supplement To Priorities Guide

**Immediately after publication, Dec. 14, 1942, of STEEL's guide to Priorities, Allocations and Prices the Iron and Steel Branch of the War Production Board was revised. Therefore, STEEL publishes this week a new personnel directory of the Iron and Steel Branch in the fold-out insert, at right. This supplement may be used to correct your copy of the Guide and if additional copies are desired they will be supplied free of charge by the Readers Service Department, Penton building, Cleveland, Ohio.**

## Hydroelectric Power Capacity Increased 43% in Year

A 43 per cent gain in hydroelectric power capacity, more than 400,000 kilowatts or enough to take care of a city of a million people, has been reported by the Bureau of Reclamation for the fiscal year 1942.

Large gains were also cited in water storage capacity. The storage capacity of reservoirs on reclamation projects rose 29 per cent owing to completion of new dams and crop values on lands supplied with irrigation water by reclamation works during the 1941 growing season jumped 35 per cent.

The year's gain in hydro power raised the total installed capacity in 28 electric plants on 17 reclamation projects in 11 western states to nearly 1,500,000 kilowatts. Three big new generators were installed in the Grand Coulee dam power plant on the Columbia river in Washington. They increased power plant capacity at the largest concrete dam in the world, also completed during the fiscal year, to more than a third of a million kilowatts. At Boulder Dam in Arizona-Nevada on the Colorado river another big generator was installed, raising the total number of generators in operation to ten—by far the largest array of hydro power ever synchronized into action under one roof—with a total capacity of more than three quarters of a million kilowatts.

## Request Data on Cast Iron Use at High Temperatures

Specific applications in which cast iron is being or has been used, successfully or otherwise, at temperatures of 450 degrees Fahr. and higher are being sought by the war metallurgy committee of the National Academy of Sciences, Washington. Survey, authorized by the War Production Board and supported by the American Foundrymens Association, will make possible the study of cast iron as a readily available substitute material in operations at elevated temperatures.

Information obtained will be reported statistically and actual details of operation will be kept confidential when desired.

Engineers, foundrymen, field service men and others who have the desired information or can make suggestions pertinent to the subject are urged to communicate with T. E. Barlow, Vanadium Corp. of America, 2440 Book building, Detroit, or C. O. Burgess, Union Carbide & Carbon Research Laboratories, 4625 Royal avenue, Niagara Falls, N. Y., who have been appointed to obtain the data.

## Historic Cumberland Furnace To Be Scrapped

Cumberland Furnace, historic landmark at Dickson, Tenn., is going to war again, this time in the form of scrap to aid the Allied war effort.

The old iron furnace, opened in 1792 by the late Gen. James Robinson of Nashville, Tenn., and producer of cannon balls used by Andrew Jackson's frontiersmen against the British at New Orleans, is expected to yield about 500 tons of scrap.

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Christmas checks totaling more than $235,000 have been distributed to 3000 plant and office workers of Acme Steel Co., Chicago, according to Charles S. Traer, president. Similarly remembered will be the more than 400 Acme employes now in the armed services in all parts of the world. For most employes, bonus is equal to two weeks' salary or wages.

# Revised Steel Divis

New Social Security Building, Washington; Telephone,

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Rails Section: O. H. Baker, Chief; W. H. Messner, R. M. Thulean
Forgings & Castings Section: G. F. Hocker, Chief; R. G. McElwee, A. A. Ohmer, W. S. Shiffer, H. W. Davidson, K. H. Hamblin, K. M. Hamilton, B. L. Weaver, W. H. Schoen Jr.
Wire, Rods & Products Section: H. M. Francis, Chief; J. P. Barclay, F. L. Downey Jr., H. E. Hartman

**Bar, Sheet & Strip Branch**

Chief: G. G. Gries
HR Bars & Semifinished Section: W. F. Vosmer, Chief; A. A. Wagner
Cold Finished Bars Section: E. B. Files, Chief
Sheet & Strip Section: L. F. Miller, Chief

**Tubular Products & Tinplate Branch**

Chief: C. H. Longfield
Pipe Section: D. F. Lacy, Chief; J. W. Owings, D. K. Miller
Tubing Section: W. H. Wiewel, Chief; N. F. Bechtold, L. W. Harston, E. S. Moorhead, A. F. Zoll
Tin Plate Section: R. F. Sentner, Chief; J. J. Maschenic, J. T. Nichols

## PROGRAM AND DISTRIBUTION

Assistant Director: Norman W. Foy

**Program Distribution Control Branch**

Requirements Section: A. J. O'Leary, Chief
Statistics & Control Section: E. L. Resler, Chief
Priorities & Allocations Section: Charles Halcomb, Chief
Inventory Section: (to be named)
Tabulating Section: C. W. Eichelberger, Chief

**Export Steel Branch**

Chief: P. F. Schucker
British Section: J. F. Johnson, Chief
Russian Section: R. H. Olson, Chief
Latin-American Section: L. S. Simons, Chief
General Export Section: T. G. Smith, Chief

**Steel Recovery Branch**

Chief: C. H. Bradley
Assistant Chief: G. R. Link
Classification Section: R. W. Frey, Chief
Products Section: E. C. Ryan, Chief
Appeals Section: W. L. Moore, Chief
Administrative Section: G. G. Broughton, Chief

**Warehouse Ste**
Chief: J. R. Stu
Merchant Trad
General Steel
Control Section

Assistant Direct

**Ferroalloys Br**
Chief: Andrew
Tungsten-Vana
E. F. Hatch
Manganese-Chr
Tantalum-Colu
F. Frasche,
Nickel Section:
Tungsten-Vana
loys Section:
Manganese-Chr
T. C. Ford,

GENER

Avery Adams, vi
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R. M. Allen, gen
Corp., Pittsburg
N. J. Clarke, vi
(Alloy Steel).
J. A. Henry, vice
(Tin Plate).
Paul Mackall, vi
Pa. (Shapes an
John Neudorfer, v
W. Va. (Wire
L. M. Parsons, v
Pittsburgh (Col
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American Rollin
W. E. Watson, v
Youngstown, O.
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# EL'S PRIORITY GUIDE

**ER 14, 1942**

## l Division of WPB

**hington; Telephone, Republic 7500**

**Warehouse Steel Branch**

Chief: J. R. Stuart
Merchant Trade Products Section: E. F. Studwell, Chief
General Steel Products Section: A. Y. Sawyer, Chief
Control Section: C. C. Fink, Chief

### FERROALLOYS

Assistant Director: Miles K. Smith

**Ferroalloys Branch**

Chief: Andrew Leith
Tungsten-Vanadium-Molybdenum-Cobalt Ores Section: E. F. Hatch, Chief
Manganese-Chrome Ore Section: O. N. Rove, Chief
Tantalum-Columbium-Titanium-Zirconium Section: D. F. Frasche, Chief
Nickel Section: R. M. Keeney, Chief
Tungsten-Vanadium-Molybdenum-Cobalt Metals & Alloys Section: M. T. Metzger, Chief
Manganese-Chromium-Silicon Metals & Alloys Section: T. C. Ford, Chief

### GENERAL STEEL PRODUCTS INDUSTRY ADVISORY COMMITTEE

Avery Adams, vice president, United States Steel Corp., Pittsburgh (Carbon Steel Bars and Semifinished).
R. M. Allen, general manager of sales, Allegheny Ludlum Steel Corp., Pittsburgh, (Stainless Steel).
N. J. Clarke, vice president, Republic Steel Corp., Cleveland (Alloy Steel).
J. A. Henry, vice president, Weirton Steel Co., Weirton, W. Va., (Tin Plate).
Paul Mackall, vice president, Bethlehem Steel Co., Bethlehem, Pa. (Shapes and Plates).
John Neudorfer, vice president, Wheeling Steel Corp., Wheeling, W. Va. (Wire Products).
L. M. Parsons, vice president, Jones & Laughlin Steel Corp., Pittsburgh (Cold Finished Bars).
W. W. Sebald, vice president and assistant general manager, American Rolling Mill Co., Middletown, O., (Sheets and Strip).
W. E. Watson, vice president, Youngstown Sheet & Tube Co., Youngstown, O. (Pipe).
J. H. Parker, vice president, Carpenter Steel Co., Reading, Pa. (Tool Steel).
Isaac Harter, executive vice president, Babcock & Wilcox Tube Co., New York. (Tubing).
A. C. Roeth, vice president, Inland Steel Co., Chicago (Rails and Track Accessories).

### INDIVIDUAL PRODUCT ADVISORY COMMITTEES

(Each of following groups includes one member of General Products Committee)

**TOOL STEEL:** W. A. Givens, vice president, Allegheny Ludlum Steel Corp., Pittsburgh; A. T. Galbraith, vice president, Crucible Steel Co. of America, New York; M. W. Saxman Jr., secretary and general sales manager, Latrobe Electric Steel Co., Latrobe, Pa.; J. O. Rinek, vice president, Universal-Cyclops Steel Corp., Bridgeville, Pa.; A. T. Clarage, president, Columbia Tool Steel Co., Chicago Heights, Ill.

**TIN PLATE:** G. E. Totten, manager of tin plate sales, Carnegie-Illinois Steel Corp., Pittsburgh; B. F. McMahon, manager of tin plate sales, Bethlehem Steel Co., Bethlehem, Pa.; A. M. Long, assistant general manager of sales, Youngstown Sheet & Tube Co., Youngstown, O.; N. B. Randolph, vice president and general sales manager, Granite City Steel Co., St. Louis; L. Irvine, assistant manager of tin plate division, Wheeling Steel Corp., Wheeling, W. Va.

**COLD FINISHED BARS:** R. E. Fitsimons, general manager, Fitsimons Steel Co., Youngstown, O.; F. C. Young, manager of sales, Union Drawn Steel Division, Republic Steel Corp., Massillon, O.; Tracy Manville, vice president, Columbia Steel & Shafting Co., Pittsburgh; J. T. Somers, president, Wyckoff Drawn Steel Co., Pittsburgh; Walter Howell, president, Bliss & Laughlin Inc., Harvey, Ill.

**PLATES AND SHAPES:** Malcolm Farmer, vice president, Phoenix Iron Co., Phoenixville, Pa.; W. W. Smith, assistant to vice president, Inland Steel Co., Chicago; F. H. Gordon, vice president, Lukens Steel Co., Coatesville, Pa.; A. H. Warren Jr., general manager of sales, Carnegie-Illinois Steel Corp., Pittsburgh; W. S. Haring, vice president, Alan Wood Steel Co., Conshohocken, Pa.

**STAINLESS STEEL:** C. E. Tuttle, president, Rustless Iron & Steel Corp., Baltimore; P. F. Voigt, manager of stainless division, Carnegie-Illinois Steel Corp., Pittsburgh and Chicago; D. B. Carson, vice president, Sharon Steel Corp., Sharon, Pa.; R. E. Christie, assistant to president, Crucible Steel Co. of America, New York; Clyde Roberts, assistant manager of alloy sales, Republic Steel Corp., Massillon, O.

**ALLOY BARS AND SEMIFINISHED:** F. L. Gibbons, manager of alloy sales, Carnegie-Illinois Steel Corp., Chicago; R. E. Tucker, manager of alloy sales, Bethlehem Steel Co., Bethlehem, Pa.; W. B. Moore, manager of sales, Timken Steel & Tubes Division, Canton, O.; Sidney Williams, executive vice president. Copperweld Steel Co., Warren, O.; Otto Seidenbecker, vice president, Wisconsin Steel Works, Chicago.

**SHEETS AND STRIP:** E. L. Wetstein, vice president, Great Lakes Steel Corp., Detroit; H. E. Robinson, manager of sales, Jones & Laughlin Steel Corp., Pittsburgh; B. J. Wilner, assistant vice president, Inland Steel Co., Chicago; J. P. Hosack, vice president and secretary, Mahoning Valley Steel Co., Niles, O.; R. C. Garlick, general sales manager, Sharon Steel Co., Sharon, Pa.

**PIPE:** W. F. McConnor, general sales manager, National Tube Co., Pittsburgh; George Clifford, vice president, Spang, Chalfant Inc., Pittsburgh; D. V. Sawhill, treasurer and general sales manager, Mercer Tube Co., Butler, Pa.; E. A. Buxton, in charge of pipe division, Bethlehem Steel Co., Bethlehem, Pa.; John Anderson, in charge of pipe division, Jones & Laughlin Steel Corp., Pittsburgh.

**RAILS AND ACCESSORIES:** J. C. Dilworth, manager of railroad material sales, Carnegie-Illinois Steel Corp., Pittsburgh; N. V. Orr, vice president, Colorado Fuel & Iron Corp., Denver; J. W. Murphy, assistant manager of sales, Bethlehem Steel Co., Bethlehem, Pa.; H. D. Scott, vice president, Wheeling Steel Corp., Wheeling, W. Va.; J. M. Mulholland, manager of rail sales, Youngstown Sheet & Tube Co., Youngstown, O.

**WIRE:** John May, vice president and general sales manager, American Steel & Wire Co., Cleveland; Henry A. Roemer Jr., president, Pittsburgh Steel Co., Pittsburgh; W. H. Gardner, general sales manager, Keystone Steel & Wire Co., Peoria, Ill.; Jack Distler, sales manager of wire department, Republic Steel Corp., Chicago; Carl Collins, vice president, Wickwire Spencer Steel Co., New York.

**CARBON BARS AND SEMIFINISHED:** R. W. Hull, manager of bar sales, Republic Steel Corp., Cleveland; L. R. Steuer, manager of bar sales, Bethlehem Steel Co., Bethlehem, Pa.; M. E. O'Brien, manager of bar sales, Inland Steel Co., Chicago; J. W. Robinson, manager of bar sales, Jones & Laughlin Steel Corp., Pittsburgh; W. W. Brown, sales manager of rolled products, Atlantic Steel Co., Atlanta, Ga.

**TUBING:** L. L. Brundred, general manager of sales, Spang, Chalfant Inc., Pittsburgh; S. L. Gabel, general manager, Superior Tube Co., Norristown, Pa.; J. A. Ireland, sales manager of mechanical tubing division, Steel & Tubes Inc., Cleveland; D. T. Marvel, assistant manager of sales, National Tube Co., Ellwood City, Pa.; E. Q. Smith, vice president, Bundy Tubing Co., Detroit; William Taggart, manager of tube sales, Timken Steel & Tube Division, Canton, O.; Aaron Waines Jr., manager of sales, Ohio Seamless Tube Co., Shelby, O.

# Construction Work Resumed on Chicago Armor-Plate Project

CONSTRUCTION was resumed last Tuesday on the $30,000,000 tank armor-plate plant at Chicago on which work was halted by WPB because of the de-emphasis on ordnance items and a new emphasis on planes and ships.

Brig. Gen. Thomas S. Hammond, chief, Chicago Ordnance District, announced that construction was being resumed on buildings and equipment needed to fill newly established production requirements.

Construction was understood to be about 90 per cent complete when work halted. The mill started rolling semi-finished steel Oct. 16. Operation at full capacity would require between 3500 and 5000 workers.

The new cast steel tank armor plant of American Steel Foundries, another large Chicago project, has been authorized to revise operations in accordance with a new production schedule, General Hammond announced. Production in the plant was curtailed three weeks ago when output of tanks, guns, shells and other ordnance items was curtailed for emphasis on planes and ships. The plant, built at a cost of $26,500,000 with funds supplied by the Defense Plant Corp., was virtually completed when the curtailment was ordered.

## More War Plant Facilities Authorized by Government

New war production facilities, expansions and equipment purchases authorized last week by the Defense Plant Corp. were announced by Jesse Jones, secretary of commerce. Defense Plant Corp. will retain title to the properties which will be operated by private companies. New authorizations include:

Execution of a contract with Marshall Stove Co., Lewisburg, Tenn., to provide for building installations, equipment and machinery in a plant in Tennessee at a cost in excess of $400,000.

Execution of a contract with the Davison Chemical Corp., Baltimore, to provide plant facilities in Maryland at a cost in excess of $100,000.

Execution of a contract with Ranco Inc., Columbus, to provide facilities in Ohio at cost in excess of $100,000.

Execution of a contract with W. F. & John Barnes Co., Rockford, Ill., to provide plant facilities in Illinois at a cost in excess of $150,000.

Increase in its contract with Republic Aviation Corp., Farmingdale, Long Island, N. Y., to provide additional facilities in Indiana at a cost in excess of $2,900,000, making a total commitment of more than $14,000,000.

Increase in its contract with Reynolds Alloys Inc., Richmond, Va., for additional plant facilities in Alabama. The increase will be in excess of $2,900,000 making a total commitment of more than $19,000,000.

Increase in its contract with W. F. & John Barnes Co., Rockford, Ill., to provide additional facilities in a plant in Illinois. The increase will be in excess of $100,000, making a total commitment in excess of $1,500,000.

Execution of contract with General Electric Co., Schenectady, N. Y., to provide equipment for a plant in Connecticut.

Execution of contract with Bell & Howell Co., Chicago, to provide plant facilities in Illinois at a cost in excess of $500,000.

Increase in contract with Coast Carbons Inc., Tacoma, Wash., to provide additional facilities in Washington, making a total commitment of $200,000.

Increase in contract with Boeing Aircraft Co., Seattle, to provide additional facilities in Washington, at a cost in excess of $1,800,000, making a total commitment in excess of $18,000,000.

Increase in contract with General Motors Corp., Detroit, to provide additional facilities in Indiana and Michigan at a cost in excess of $2,000,000, resulting in an overall commitment in excess of $63,000,000.

Increase in contract with General Motors Corp., Detroit, to provide additional equipment in a plant in Michigan, making an overall commitment in excess of $1,200,000.

Increase in contract with Walter Kidde & Co. Inc., New York, to provide additional facilities in New Jersey, making overall commitment over $5,000,000.

Increase in contract with Joshua Hendy Iron Works, Sunnyvale, Calif., to provide additional facilities at a plant in California at a cost in excess of $300,000, making a total commitment in excess of $3,500,000.

## Rubber Companies To Run New Synthetic Plant

Rubber Reserve Co. has made a contract with National Synthetic Rubber Corp. for the operation of a government-owned synthetic rubber plant to be built in Kentucky by Defense Plant Corp., Jesse H. Jones, secretary of commerce, announced last week. Plant's output will be allocated by the government, together with products of other government-owned synthetic rubber plants.

Five independent rubber companies participate in the ownership of National Synthetic Rubber Corp. They are Goodall Rubber Inc., and Hamilton Rubber Mfg. Co., both of Trenton, N. J.; Hewitt Rubber Corp., Buffalo, N. Y.; Lee Rubber & Tire Corp., Conshohocken, Pa.; and Minnesota Mining & Mfg. Co., St. Paul, Minn.

Loss of crude rubber from the Orient, due to the war, is said to have motivated the joint operation. In addition to pooling capital, technical advisory staffs from all of the firms will serve National Synthetic management. W. W. Benner of Lee Rubber & Tire Corp. is president.

## Kaiser-Owned Engine Works Buys Crocker-Wheeler Co.

Purchase of the assets and business of Crocker-Wheeler Electric Mfg. Co., of Ampere, N. J., by Joshua Hendy Iron Works Co., Sunnyvale, Calif., in which Henry J. Kaiser and his associates of the Six Companies are the sole stockholders, was described last week as a major expediency in furthering the war effort by Charles E. Moore, president of the California concern.

Mr. Moore said the combination of Crocker-Wheeler, manufacturer of heavy electrical machinery for ships, steel mills and industrial plants, and the Joshua Hendy Co., which is producing 274,000-pound reciprocal steam engines for the "Liberty" merchant fleet, makes a team "each member of which will contribute more than the sum of the parts" and together representing 140 years of progress and varied specialization in mechanical and electrical fields. The enlarged Hendy organization will employ about 8000 persons.

Purchase price was reported as $3,200,000 cash, permitting distribution of about $11 per share to Crocker-Wheeler shareholders on final dissolution of the company. The C&W Liquidating Co. has been formed, with headquarters at Sunnyvale, Calif., to handle the details. Edward S. Perot, former president of Crocker-Wheeler, will serve as president of the liquidating firm.

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Aluminum Co. of America announces that its production of forgings now is at a rate 25 times that of 1938, the year before the outbreak of war in Europe. A comparatively new industry at the beginning of the war, its expansion leads in the aluminum field.

## Oster Mfg. Co. Observes Fiftieth Anniversary

The year 1943 marks the fiftieth anniversary of Oster Mfg. Co., Cleveland, manufacturer of pipe and bolt-threading equipment and turret lathes. Company was founded in 1893 by the late Herman W. Oster and Russell B. Tewksbury. Following several expansions, a merger was effected in 1929 with the Williams Tool Corp. which gave Oster two additional plants, one in Erie, Pa., and another in Brantford, Ont., Canada. Company is currently engaged in production for the armed services. Roger Tewksbury, son of one of the founders, is president of the firm.

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William Jessop & Sons Inc. has moved its Chicago office and warehouse to 1724 West Carroll avenue. Hans Johnson is district representative.

—o—

Designers for Industry Inc., Cleveland, has moved its general offices to 2915 Detroit avenue.

—o—

Singer Steel Co., Cleveland, has established a branch office in Detroit at 7310 Woodward avenue. Robert L. Herman is district manager.

—o—

Allis-Chalmers Mfg. Co., Milwaukee, has appointed Detroit Sales Engineering Co., under direction of Elmer Wettlaufer, president, representative for its complete line of welding equipment in the lower Michigan and northern Indiana territory. G. J. Keller and Al Corsini will also represent the line in that area.

—o—

Micromatic Hone Corp. has moved to new quarters at 8100 Schoolcraft avenue, Detroit.

—o—

A. B. Murray Co. Inc., boiler plates, tubes, bolts and nuts and other steel specialties, has moved its general offices from 147 Wolcot street, Brooklyn, N. Y., to 1145 East Jersey street, Elizabeth, N. J.

—o—

Detroit Rex Products Co., manufacturer of degreasers and chemical cleaning compounds, has established a monthly company publication. It will be mailed to employes' homes, to former employes in the armed forces and to field men and branch offices. It is designed to maintain present high employe morale.

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General offices of Philgas Division, Phillips Petroleum Co., have been moved from the General Motors building, Detroit, to Phillips' principal operating offices at Bartlesville, Okla., to permit closer correlation of policy and operations problems. The Detroit Tank Car section of Philgas Division will continue the present district sales and service office in the General Motors building. The Detroit office is under direction of W. F. DeVoe.

—o—

Rockwell Engineering Co., 10126 South Western avenue, Chicago, has been formed by Anthony J. Rudis, formerly sales engineer, Arthur J. O'Leary & Son Co., Chicago, to engage in the manufacture of steel products to customers' specifications.

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Westinghouse Electric & Mfg. Co.'s Lamp division recently replaced its branch office organization in Philadelphia with a complete district office which will serve parts of six states and the District of Columbia. Harry A. Croasdale is manager of the new Middle Atlantic district.

—o—

Grede Foundries Inc., Milwaukee, has purchased plant and equipment of Smith Steel Foundry Co., Milwaukee, and will continue without interruption production of steel castings. Fred V. Gardner, president of Smith Steel Foundry, will return to full time management of his business engineering company, Fred V. Gardner Associates. Direct supervision of the new unit, known as Smith Steel Foundry Division, will be under J. J. Ewens, present works manager, Milwaukee Steel Foundry Division. John W. Perry Jr., vice president and sales manager, Grede Foundries, will also have charge of sales of the Smith Steel Foundry Division.

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As a result of a recent agreement, all Canadian distribution of welders and electrodes manufactured by Harnischfeger Corp., Milwaukee, will be handled exclusively by Canadian Fairbanks-Morse Co. Ltd.

Canadian Fairbanks-Morse has branch offices and warehouses in all important Canadian cities, staffed with engineers and service men. Main offices are at 980 St. Antoine street, Montreal.

Canadian-Fairbanks-Morse also handles machine tool equipment, automotive equipment and accessories, and home appliances. It operates a factory in Sherbrooke, Que., where scales, valves, oil burners, stoves and boilers are manufactured, and where considerable general foundry work is done.

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Master Finishers Inc., 2427 South Prairie avenue, Chicago, will double its capacity through purchase of the building at 2415 South Prairie avenue. Company is engaged in war goods production.

## WOMEN MAKE ARMOR-PIERCING SHELL CORES

WOMEN who used to turn out automobile parts for Chrysler Corp. are now busily engaged in producing armor-piercing shell cores by the million in a Chrysler Ordnance plant

# Great Lakes Shippers Protest Imposition of "Hiring Hall"

STRONG protests against imposition of the "hiring hall" for Great Lakes iron ore vessels by a panel of the National War Labor Board were directed to the board and to Joseph B. Eastman, director of defense transportation, last week by lake shippers.

The ore men requested that a full public hearing be held on the issue.

Three Cleveland members of the Office of Defense Transportation Advisory Committee on Great Lakes transportation wired Mr. Eastman asking him to use his influence with the NWLB to grant a public hearing. The three are: Edward B. Greene, president, Cleveland Cliffs Iron Co.; Elton Hoyt II, senior partner, Pickands, Mather & Co.; and George Humphrey, president, M. A. Hanna Co. Their telegram to Mr. Eastman:

"As you well know, we have just completed delivery of over 92,000,000 gross tons of iron ore, the greatest tonnage of all time, which compares with a total of 80,000,000 tons last year and the high record prior to that time of about 66,000,000 tons.

"With the steel expansion program nearing completion you are expecting a movement of 100,000,000 gross tons next year.

"This great accomplishment is only possible through perfect co-operation of every man engaged in the industry and the unceasing efforts of the officers and crews on the ships from the opening of navigation until its close, under all kinds of weather conditions, working in perfect harmony with the dispatching officers, resulting in less delay in port and the fastest dispatch obtained anywhere in the world.

"We therefore sincerely believe that no innovations such as the creation of the union hiring halls should be injected at this critical time; nor should any important change in existing conditions be made which would interfere with the tremendous performance required next year by the vital war necessities without a full public hearing where everyone in the industry can be heard.

"We strongly recommend that you use your influence to urge the War Labor Board to grant such a hearing at some appropriate time on the vital matters involved."

Inland Steel Co., Chicago, in a wire to the NWLB protested the "hiring hall" would "deprive us of the right to select employes on merit", and also asked for a public hearing.

Under the "hiring hall" system, Inland contended, the union sends unlicensed seamen to vessels without regard to merit or experience but solely on a first come, first served basis, with union activity sometimes influencing the seamen's standing.

Inland also charged the NWLB panel's order was a violation of the President's pledge that the government would not order, nor would Congress pass legislation, establishing the closed shop. The "hiring hall" system, it continued, goes beyond the closed shop.

## FORD "TEAMS" STEP UP PACE ON BOMBER SECTIONS

One of the Ford Willow Run, Mich., bomber-building "teams", Department 936, has cut construction time for the center wing section of the giant B-24 bomber by 53.5 hours—evidence of the growing "know-how" at Willow Run and facility of production design. The center section supports the four big engines which power the B-24, and is the backbone for much of the stress of the entire ship. Through this section run many vital controls, including housing for the landing gear. Photo shows a team at work on the section.

## War Factories Requested To Operate New Year's Day

Chairman Donald M. Nelson of the War Production Board has announced that war production factories will be expected to observe normal working schedules on New Year's Day.

"Ever since Pearl Harbor, we have asked workers and management in war plants to forego their customary holidays in order to maintain unbroken production schedules," Mr. Nelson said. "The response to these requests has been remarkably good, and the effect on production has been excellent. The one exception that has been made to this rule during the past year has been in connection with the observance of Christmas.

"New Year's Day should not cause a break in the steady flow of production. We can best start the new year by staying on the job and getting out a regular work-day's production of war goods."

## G-E Plans To Hire 40,000 Women in '43; 80,000 in '44

During the coming year the number of women employed at General Electric Co. plants will reach 40,000 according to estimates of Gerard Swope, president. By the end of 1944 this figure is expected to double, with about 80,000 women, or 15,000 more than company's pre-war employment of both sexes, on the rolls.

## 43 Additional Firms Honored for Output

FORTY-THREE industrial plants were selected last week by the Army and Navy for recognition for outstanding production of war materials. All will receive the joint "E" flag, and their employes will be awarded Army-Navy "E" pins.

Latest recipients include:

Aliquippa plant, Jones & Laughlin Steel Corp., Aliquippa, Pa.

Almond street plant, DeRossi & Son Co., Vineland, N. J.

Andover-Kent Aviation Corp., Middletown, Conn.

Bedminster plant, William F. Fretz & Son, Bedminster, Pa.

Chromium Corp. of America, Waterbury, Conn.

Converse Rubber Co., Malden, Mass.

Crescent Truck Co., Lebanon, Pa.

Davis & Geck Inc., Brooklyn, N. Y.

The De Vilbiss Co., Toledo, O.

Dolomite barge plant, Dolomite Products Co., Gates, N. Y.

Elmer street plant, DeRossi & Son Co., Vineland, N. J.

Erie plant, Bucyrus-Erie Co., Milwaukee.

The Estate Stove Co., Hamilton, O.

Franklin Plastics Division, Robinson Industries Inc., Franklin, Pa.

Ben C. Gerwick Inc., Oakland Quartermaster Depot Wharf Project, Oakland, Calif.

Highland Park Division, Wood Mosaic Co., Louisville, Ky.

Horni Signal Mfg. Corp., New York.

Kearny plant, Congoleum-Nairn Inc., Kearny, N. J.

Kingsbury Ordnance Plant, Todd & Brown Inc., La Porte, Ind.

R. G. LeTourneau Inc., Peoria, Ill.

London road plant, Bryant Heater Co., Cleveland.

Midland plant, The Dow Chemical Co., Midland, Mich.

Monsanto plant, Organic Chemicals Division, Monsanto Chemical Co., Monsanto, Ill.

Ontario Works Plant, General Electric Co., Ontario, Calif.

Pipersville plant, William F. Fretz & Sons, Pipersville, Pa.

Pullman Standard Car Mfg. Co., Hammond, Ind.

Radio Receptor Co. Inc., New York.

Southern Steel Co., San Antonio, Tex.

St. Louis plant, Monsanto Chemical Co. Monsanto, Ill.

Superior Steel & Malleable Castings Co., Benton Harbor, Mich.

Tractor works, Allis-Chalmers Mfg. Co., Springfield, Ill.

Toledo Dye Works, The Textileleather Corp., Toledo, O.

Vega Aircraft Corp., Burbank, Calif.

Warren Webster & Co., Camden, N. J.

Westinghouse Electric & Mfg Co., East Springfield, Mass.

Whitney Blake Co., New Haven, Conn.

### DISSTON HONORED FOR WAR PRODUCTION

CROWD watches ceremonies at presentation of Army-Navy "E" award to Henry Disston & Sons Inc., Philadelphia, Dec. 1

## Confer Maritime "M" on Shipyards, Industries

Seven shipyards and nine manufacturing plants, located in all parts of the United States, have been designated to receive Maritime Commission "M" awards and gold stars for meritorious production.

Delta Shipbuilding Co. Inc., New Orleans, for the first time will receive the commission's "M" pennant, victory fleet flag, and labor merit badges for all workers for achievement in the production of Liberty ships.

Six other yards designated to receive gold stars for continued achievement in ship production are: Bethlehem-Fairfield Shipyard Inc., Baltimore; California Shipbuilding Corp., Wilmington, Calif.; North Carolina Shipbuilding Co., Wilmington, N. C.; Oregon Shipbuilding Corp., Portland, Oreg.; Richmond Shipyard No. 1, Richmond, Calif.; Richmond Shipyard No. 2, Richmond, Calif.

Nine manufacturing plants will receive the Maritime "M" pennant, victory fleet flag, and labor merit badges for their employes for the first time. They are: Alcoa Division of American Locomotive Co., New York; Cooper-Bessemer Corp., plants at Mt. Vernon, O., and Grove City, Pa.; Davis Engineering Corp., Elizabeth, N. J.; Federal Telephone & Radio Corp., Newark, N. J.; M. W. Kellogg Co., Jersey City, N. J.; National Supply Co., Springfield, O.; Production Engineering Co., Berkeley, Calif.; Tube-Turns Inc., Louisville, Ky.; Young Iron Works, Seattle.

## Industrial Hygiene Group Elects New Trustees

Election of four new members to the board of trustees of Industrial Hygiene Foundation, which recently held its seventh annual meeting at Mellon Institute, Pittsburgh, has been announced. They are: Ned H. Dearborn, executive vice president, National Safety Council; Professor Philip Drinker, Harvard School of Public Health; Lieut. Col. A. J. Lanza, M. C., Chief, Occupational Hygiene Branch, U. S. Army; and Dr. C. D. Selby, medical consultant, General Motors Corp.

# Index of Activity Climbs to New Peak

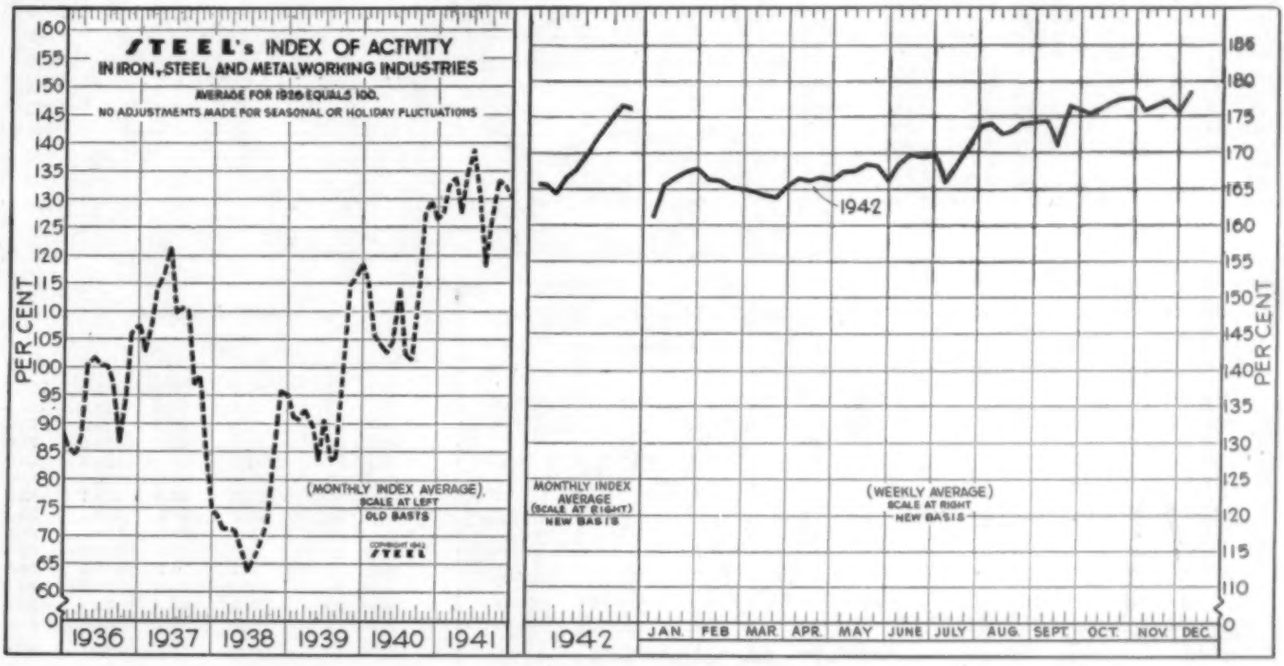
RECENT moves initiated in Washington in placing responsibility for scheduling war goods production in the hands of one man, appointment of a Federal Petroleum Co-ordinator for War, extension of War Manpower Commissioner's control over the nation's armed and civilian manpower and the granting to the Secretary of Agriculture expanded control over production and distribution of food and agricultural products, has done much to centralize authority over wartime economy.

Order cancellations continue to be received from manufacturers of certain military items to allow expansion in aircraft and ship construction. Although reducing the exceptionally heavy order backlogs in some lines, the cancellations have not yet had much effect on current output.

During the week ended Dec. 12 STEEL's index of activity climbed to a new peak of 178.6. This compares with 177.1 recorded in the preceding week. The former high point registered by the index of 177.8 occurred in the week ended Oct. 31.

The national steel rate remained unchanged at 99.5 per cent during the week ended Dec. 12, compared with 97.5 in the like week a year ago. Steel scrap supply situation has improved, with mills able to accumulate moderate stocks. However, as yet there is no real assurance that the flow of scrap to the mills can sustain present practical capacity operations throughout the winter months.

Electric power consumption reached a new all-time high of 3,937,524,000 kilowatts during the latest period. Compared with a year ago power output is up 13.3 per cent. Revenue freight carloadings advanced to about 780,000 cars during the week ended Dec. 12. Freight moved by the Class I railroads this year is expected to top the 1941 volume by 32 per cent on a ton-mile basis.


STEEL's INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
AVERAGE FOR 1926 EQUALS 100.
NO ADJUSTMENTS MADE FOR SEASONAL OR HOLIDAY FLUCTUATIONS
PER CENT
(MONTHLY INDEX AVERAGE) SCALE AT LEFT OLD BASIS
COPYRIGHT 1942 STEEL
1936
1937
1938
1939
1940
1941
1942
MONTHLY INDEX AVERAGE (SCALE AT RIGHT) NEW BASIS
(WEEKLY AVERAGE) SCALE AT RIGHT NEW BASIS
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
PER CENT

*STEEL's index of activity gained 1.5 points to 178.6 in the week ending Dec. 12:*

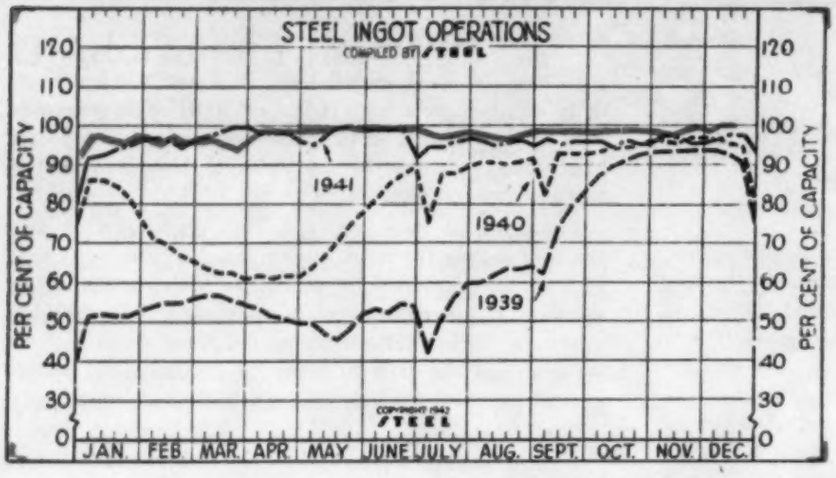
| Week Ended | 1942 | 1941 |
|---|---|---|
| Oct. 10 | 176.5 | 132.3 |
| Oct. 17 | 176.9 | 133.4 |
| Oct. 24 | 177.7 | 133.5 |
| Oct. 31 | 177.8 | 133.8 |
| Nov. 7 | 175.6 | 134.4 |
| Nov. 14 | 176.2 | 133.8 |
| Nov. 21 | 177.3 | 128.4 |
| Nov. 28 | 174.0 | 132.2 |
| Dec. 5 | 177.1 | 133.4 |
| Dec. 12 | 178.6† | 134.0 |

†Preliminary.

| Mo. Data | 1942 | 1941 | 1940 | 1939 | 1938 | 1937 | 1936 | 1935 | 1934 | 1933 | 1932 | 1931 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan. | 165.7 | 127.3 | 114.7 | 91.1 | 73.3 | 102.9 | 85.9 | 74.2 | 58.8 | 48.6 | 54.6 | 69.1 |
| Feb. | 165.6 | 132.3 | 105.8 | 90.8 | 71.1 | 106.8 | 84.3 | 82.0 | 73.9 | 48.2 | 55.3 | 75.5 |
| March | 164.6 | 133.9 | 104.1 | 92.6 | 71.2 | 114.4 | 87.7 | 88.1 | 78.9 | 44.5 | 54.2 | 80.4 |
| April | 166.7 | 127.2 | 102.7 | 89.8 | 70.8 | 116.6 | 100.8 | 85.0 | 83.8 | 52.4 | 52.8 | 81.0 |
| May | 167.7 | 134.8 | 104.6 | 83.4 | 67.4 | 121.7 | 101.8 | 81.8 | 83.7 | 63.5 | 54.8 | 78.6 |
| June | 169.4 | 138.7 | 114.1 | 90.9 | 63.4 | 109.9 | 100.3 | 77.4 | 80.8 | 70.3 | 51.4 | 72.1 |
| July | 171.0 | 128.7 | 102.4 | 83.5 | 66.2 | 110.4 | 100.1 | 75.3 | 68.7 | 77.1 | 47.1 | 67.3 |
| Aug. | 173.5 | 118.1 | 101.1 | 83.9 | 68.7 | 110.0 | 97.1 | 76.7 | 63.0 | 74.1 | 45.0 | 67.4 |
| Sept. | 174.8 | 126.4 | 113.5 | 98.0 | 72.5 | 96.8 | 86.7 | 69.7 | 56.9 | 68.0 | 46.5 | 64.3 |
| Oct. | 176.9 | 133.1 | 127.8 | 114.9 | 83.6 | 98.1 | 94.8 | 77.0 | 56.4 | 63.1 | 48.4 | 59.3 |
| Nov. | 175.8 | 132.2 | 129.5 | 116.2 | 95.9 | 84.1 | 106.4 | 88.1 | 54.9 | 52.8 | 47.5 | 54.4 |
| Dec. | | 130.2 | 126.3 | 118.9 | 95.1 | 74.7 | 107.6 | 88.2 | 58.9 | 54.0 | 46.2 | 51.3 |

**Note: Weekly and monthly indexes for 1942 have been adjusted to offset the forced curtailment in automobile production and to more accurately reflect expanding steel production.**

# THE BUSINESS TREND

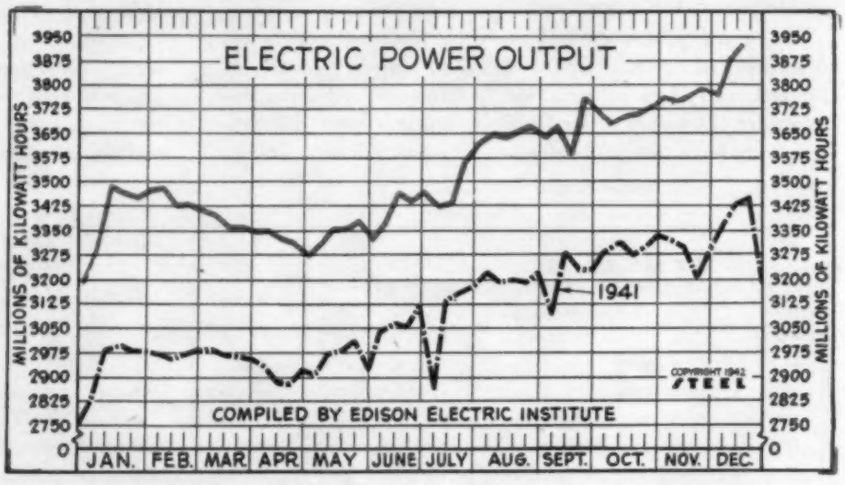


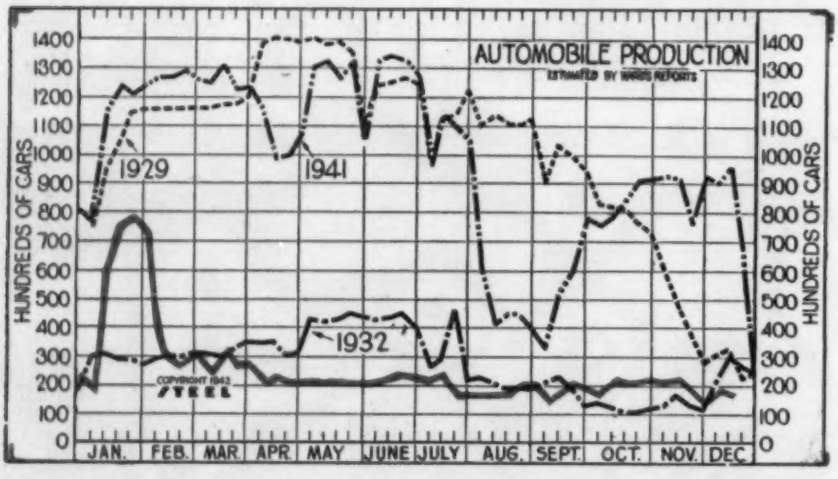

**Steel Ingot Operations**
**(Per Cent)**

| Week ended | 1942 | 1941 | 1940 | 1939 |
|---|---|---|---|---|
| Dec. 12 | 99.5 | 97.5 | 95.5 | 92.5 |
| Dec. 5 | 99.5 | 96.5 | 96.5 | 94.0 |
| Nov. 28 | 99.0 | 95.0 | 97.0 | 94.0 |
| Nov. 21 | 99.5 | 95.5 | 97.0 | 96.5 |
| Nov. 14 | 99.0 | 97.0 | 96.0 | 96.5 |
| Nov. 7 | 98.5 | 97.5 | 96.5 | 96.0 |
| Oct. 31 | 99.0 | 95.5 | 96.5 | 93 0 |
| Oct. 24 | 99.0 | 95.5 | 95.5 | 92.0 |
| Oct. 17 | 99.0 | 96.5 | 95.0 | 91.0 |
| Oct. 10 | 98.5 | 94.5 | 94.5 | 89.5 |
| Oct. 3 | 98.0 | 96.0 | 93.5 | 87.5 |
| Sept. 26 | 98.0 | 96.0 | 93.0 | 84.0 |
| Sept. 19 | 98.0 | 96.0 | 96.0 | 79.5 |
| Sept. 12 | 98.0 | 96.5 | 93.0 | 74.0 |
| Sept. 5 | 98.0 | 95.5 | 82.0 | 68.0 |
| Aug. 29 | 98.0 | 96.5 | 91.5 | 64.0 |
| Aug. 22 | 97.5 | 96.6 | 90.5 | 63.5 |

**Electric Power Output**
**(Million KWH)**

| Week ended | 1942 | 1941 | 1940 | 1939 |
|---|---|---|---|---|
| Dec. 12 | 3,938 | 3,431 | 3,004 | 2,674 |
| Dec. 5 | 3,884 | 3,368 | 2,976 | 2,654 |
| Nov. 28 | 3,766 | 3,295 | 2,932 | 2,605 |
| Nov. 21 | 3,795 | 3,205 | 2,839 | 2,561 |
| Nov. 14 | 3,776 | 3,305 | 2,890 | 2,587 |
| Nov. 7 | 3,762 | 3,326 | 2,858 | 2,589 |
| Oct. 31 | 3,775 | 3,339 | 2,882 | 2,609 |
| Oct. 24 | 3,753 | 3,299 | 2,867 | 2,622 |
| Oct. 17 | 3,717 | 3,273 | 2,838 | 2,576 |
| Oct. 10 | 3,702 | 3,315 | 2,817 | 2,583 |
| Oct. 3 | 3,683 | 3,290 | 2,792 | 2,554 |
| Sept. 26 | 3,720 | 3,233 | 2,816 | 2,559 |
| Sept. 19 | 3,757 | 3,232 | 2,769 | 2,538 |
| Sept. 12 | 3,571 | 3,281 | 2,773 | 2,532 |
| Sept. 5 | 3,673 | 3,096 | 2,592 | 2,376 |
| Aug. 29 | 3,640 | 3,224 | 2,736 | 2,442 |


ELECTRIC POWER OUTPUT
MILLIONS OF KILOWATT HOURS
1941
COPYRIGHT 1942 STEEL
COMPILED BY EDISON ELECTRIC INSTITUTE
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.




**Auto Production**
**(1000 Units)**

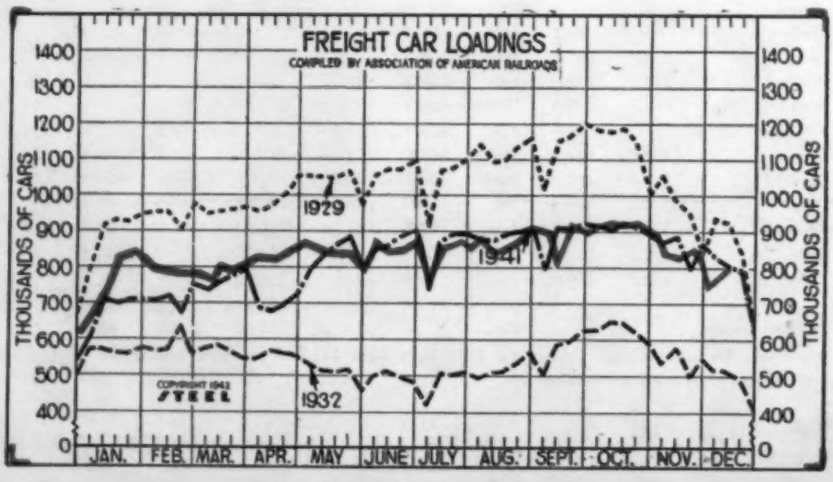
| Week ended | 1942 | 1941 | 1940 | 1939 |
|---|---|---|---|---|
| Dec. 12 | 17.8 | 96.0 | 125.6 | 118.4 |
| Dec. 5 | 19.9 | 90.2 | 124.8 | 115.5 |
| Nov. 28 | 14.6 | 93.5 | 128.8 | 93.6 |
| Nov. 21 | 18.3 | 76.8 | 102.3 | 72.5 |
| Nov. 14 | 20.2 | 93.0 | 121.9 | 86.7 |
| Nov. 7 | 20.2 | 93.6 | 120.9 | 86.2 |
| Oct. 31 | 20.9 | 92.9 | 118.1 | 82.7 |
| Oct. 24 | 20.8 | 91.9 | 117.1 | 78.2 |
| Oct. 17 | 20.2 | 85.6 | 114.7 | 70.1 |
| Oct. 10 | 20.3 | 79.1 | 108.0 | 75.9 |
| Oct. 3 | 19.9 | 76.8 | 105.2 | 76.1 |
| Sept. 26 | 20.9 | 78.5 | 96.0 | 62.8 |
| Sept. 19 | 21.0 | 60.6 | 78.8 | 54.0 |
| Sept. 12 | 19.6 | 53.2 | 66.6 | 41.2 |
| Sept. 5 | 16.9 | 32.9 | 39.7 | 26.9 |

Figures since Feb. 21 last include Canadian trucks and automobiles and United States trucks.

**Freight Car Loadings**
**(1000 Cars)**

| Week ended | 1942 | 1941 | 1940 | 1939 |
|---|---|---|---|---|
| Dec. 12 | 780† | 807 | 736 | 681 |
| Dec. 5 | 760 | 833 | 739 | 687 |
| Nov. 28 | 844 | 866 | 729 | 689 |
| Nov. 21 | 836 | 799 | 733 | 677 |
| Nov. 14 | 827 | 884 | 745 | 771 |
| Nov. 7 | 829 | 874 | 778 | 786 |
| Oct. 31 | 891 | 893 | 795 | 806 |
| Oct. 24 | 903 | 914 | 838 | 834 |
| Oct. 17 | 901 | 923 | 814 | 861 |
| Oct. 10 | 910 | 904 | 812 | 845 |
| Oct. 3 | 908 | 918 | 806 | 835 |
| Sept. 26 | 898 | 920 | 822 | 835 |
| Sept. 19 | 903 | 908 | 818 | 815 |
| Sept. 12 | 815 | 914 | 804 | 806 |

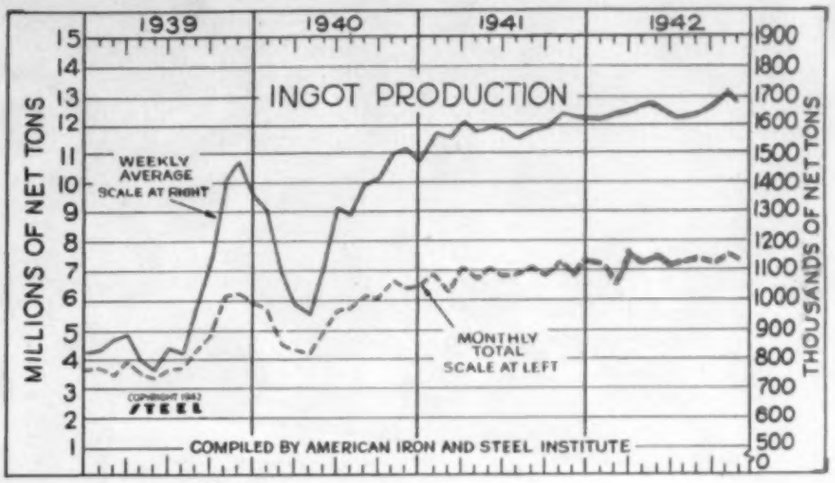
†Preliminary.

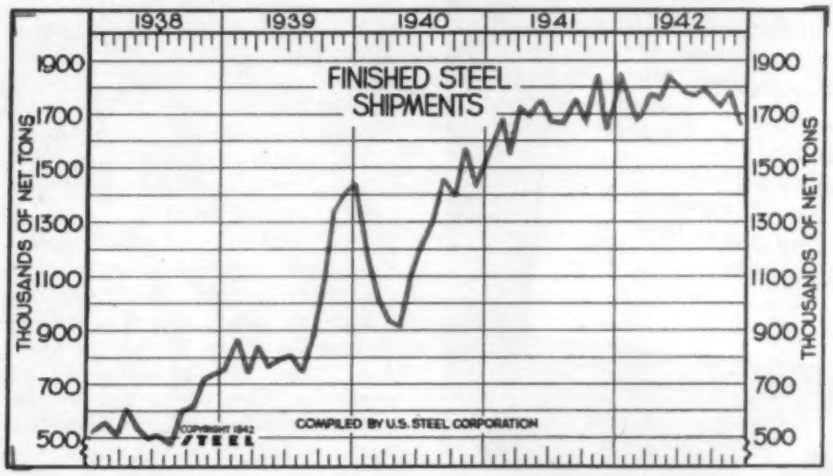


### Steel Ingot Production

(Unit 100 Net Tons)

| | Monthly Total | | Weekly Average | |
|---|---|---|---|---|
| | 1942 | 1941 | 1942 | 1941 |
| Jan. | 7,124.9 | 6,922.4 | 1,608.3 | 1,562.6 |
| Feb. | 6,521.1 | 6,230.4 | 1,630.3 | 1,557.6 |
| Mar. | 7,392.9 | 7,124.0 | 1,668.8 | 1,608.1 |
| April | 7,122.3 | 6,754.2 | 1,660.2 | 1,574.4 |
| May | 7,386.9 | 7,044.6 | 1,667.5 | 1,590.2 |
| June | 7,022.2 | 6,792.8 | 1,636.9 | 1,583.4 |
| July | 7,148.8 | 6,812.2 | 1,617.4 | 1,541.2 |
| Aug. | 7,283.5 | 6,997.5 | 1,632.8 | 1,579.6 |
| Sept. | 7,067.1 | 6,811.8 | 1,651.2 | 1,591.5 |
| Oct. | 7,584.9 | 7,236.1 | 1,712.2 | 1,633.4 |
| Nov. | 7,184.6 | 6,960.9 | 1,674.7 | 1,622.6 |
| Dec. | ..... | 7,150.3 | ..... | 1,617.7 |
| Total | ..... | 82,836.9 | ..... | 1,588.7 |




### Finished Steel Shipments
### U. S. Steel Corp.

(Unit 1000 Net Tons)

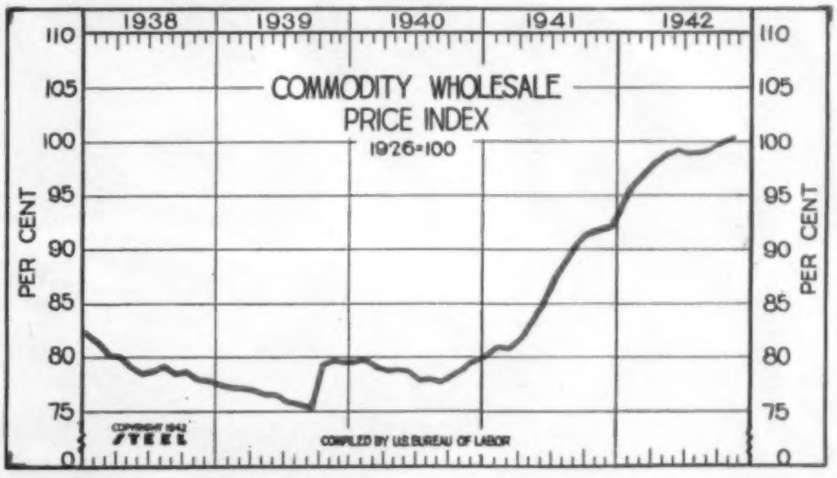
| | 1942 | 1941 | 1940 | 1939 | 1938 |
|---|---|---|---|---|---|
| Jan. | 1738.9 | 1682.5 | 1145.6 | 870.9 | 570.3 |
| Feb. | 1616.6 | 1548.5 | 1009.3 | 747.4 | 522.4 |
| Mar. | 1780.9 | 1720.4 | 931.9 | 845.1 | 627.0 |
| Apr. | 1758.9 | 1687.7 | 907.9 | 771.8 | 550.5 |
| May | 1834.1 | 1745.3 | 1084.1 | 795.7 | 509.8 |
| June | 1774.1 | 1668.6 | 1209.7 | 807.6 | 525.0 |
| July | 1765.7 | 1666.7 | 1296.9 | 745.4 | 484.6 |
| Aug. | 1788.7 | 1753.7 | 1455.6 | 885.6 | 615.5 |
| Sept. | 1703.6 | 1664.2 | 1392.8 | 1086.7 | 635.6 |
| Oct. | 1787.5 | 1851.3 | 1572.4 | 1345.9 | 730.3 |
| Nov. | 1665.5 | 1624.2 | 1425.4 | 1406.2 | 749.3 |
| Dec. | ..... | 1846.0 | 1544.6 | 1444.0 | 765.9 |
| Tot.† | ..... | 20,458.9 | 15,013.7 | 11707.3 | 7315.5 |

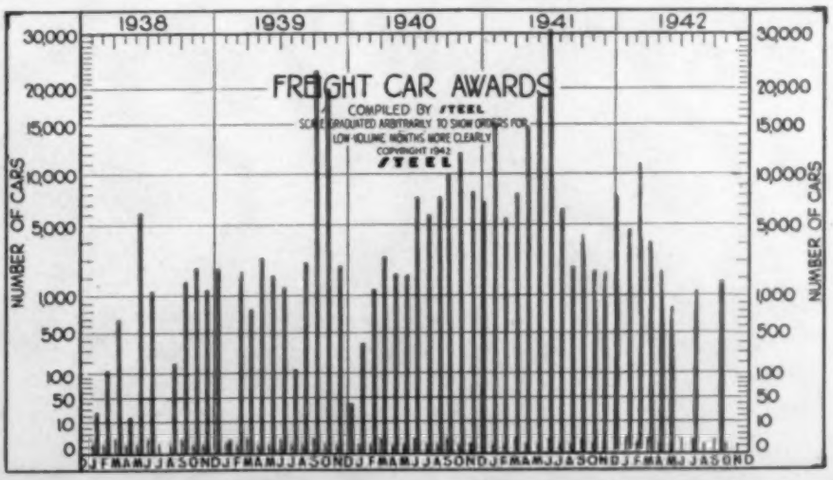
†After year-end adjustments.

### All Commodity
### Wholesale Price Index
### U. S. Bureau of Labor

(1926 = 100)

| | 1942 | 1941 | 1940 | 1939 | 1938 |
|---|---|---|---|---|---|
| Jan. | 96.0 | 80.8 | 79.4 | 76.9 | 80.9 |
| Feb. | 96.7 | 80.6 | 78.7 | 76.9 | 79.8 |
| March | 97.6 | 81.5 | 78.4 | 76.7 | 79.7 |
| April | 98.7 | 83.2 | 78.6 | 76.2 | 78.7 |
| May | 98.8 | 84.9 | 78.4 | 76.2 | 78.1 |
| June | 98.6 | 87.1 | 77.5 | 75.6 | 78.3 |
| July | 98.6 | 88.8 | 77.7 | 75.4 | 78.8 |
| Aug. | 99.2 | 90.3 | 77.4 | 75.0 | 78.1 |
| Sept. | 99.6 | 91.8 | 78.0 | 79.1 | 78.3 |
| Oct. | 100.0 | 92.4 | 78.7 | 79.4 | 77.6 |
| Nov. | | 92.5 | 79.6 | 79.2 | 77.5 |
| Dec. | | 93.6 | 80.0 | 79.2 | 77.0 |
| Ave. | | 87.3 | 78.5 | 77.1 | 78.6 |





1938
1939
1940
1941
1942
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW-VOLUME MONTHS MORE CLEARLY
COPYRIGHT 1942 STEEL
NUMBER OF CARS
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

### Freight Car Awards

| | 1942 | 1941 | 1940 | 1939 |
|---|---|---|---|---|
| Jan. | 4,253 | 15,169 | 360 | 5 |
| Feb. | 11,725 | 5,508 | 1,147 | 2,250 |
| March | 4,080 | 8,074 | 3,104 | 800 |
| April | 2,125 | 14,645 | 2,077 | 3,095 |
| May | 822 | 18,630 | 2,010 | 2,051 |
| June | 0 | 32,749 | 7,475 | 1,324 |
| July | 1,025 | 6,459 | 5,846 | 110 |
| Aug. | 0 | 2,668 | 7,525 | 2,814 |
| Sept. | 1,863 | 4,470 | 9,735 | 23,000 |
| Oct. | 0 | 2,499 | 12,195 | 19,634 |
| Nov. | 0 | 2,222 | 8,234 | 2,650 |
| 10 mos. | 25,893 | 113,093 | 59,708 | 57,740 |
| Dec. | . | 8,406 | 7,181 | 35 |
| Total | ... | 121,499 | 66,889 | 57,775 |

# WOMEN

## *Run this shop... ...and do it well*

**With a permanent policy of employing as many women as possible, this company is unusually successful in using women on machine operations. More than 80 per cent of employes are women. Special machines and accessories are designed to fit needs of women operators. Attractive policies on selection, training, supervision, recreation and compensation feature this successful program and show how to adapt production jobs for women workers**

By HERBERT E. FLEMING

UNIQUE in the metalworking industry in the United States is a policy of having only women operate cut-off, milling, grinding, straightening, spinning and other machines. That is the permanent program of the Republic Drill & Tool Co., Chicago, manufacturer of twist drills. It is a foundation policy, adopted before the company began production in August 1941. And it is a practice that has proved pat for war production, for Republic Drill is engaged 100 per cent, mostly on prime contracts, in making drills for boring rivet and bolt holes in aircraft, ships, guns, tanks, armored cars and other military equipment. Its force has grown to over 2000, and more than four-fifths of them are women.

As a significant result, Republic Drill & Tool Co. has been one of five companies throughout the country to receive notable citations for employment of women. This award was made in mid-October after a broad survey by the National Federation of Business and Professional Women Inc.

In adopting and developing this women-only policy, Clarence Avildsen, chairman, and Earl F. Reinhart, president, as well as other engineering and production executives of this company emphasized that they are not romantic sentimentalists at all but hard-headed business men who previously have had long experience in manufacture of drills by men employes. They were formerly in another drill company (United Drill & Tool Corp.) — Mr. Avildsen as president and chairman of the board, Mr. Reinhart as vice president, and others as operating heads. When Mr. Avildsen

organized Republic, these associates joined in the undertaking of twist drill manufacture through the well-nigh exclusive services of women.

For years Mr. Avildsen had had the idea that if the biological characteristics of women were taken into account, their deftness, patience and industry could be well utilized for efficient-production of twist drills. On a visit to England in 1939, this idea was confirmed by a visit to a hack-saw plant where all the employes were women except one — the works manager. He was impressed by what had been done there in adapting jobs and machines to the requirements of women. He also noted some operations that could have been made easier.

The principal biological handicap of women for operating metalworking machines which Republic has taken into account, as Mr. Reinhart says, "is the established fact that the physical strength of the average woman is only a little more than half of that of a man." *This has been kept in mind in the break-down of complicated jobs into a series of simple operations, in the design of special machines, in the adaptation of standard machines and in the program for selection, training, supervision, rest and recreation.*

"There is no miracle here," said Mr. Reinhart, while showing the writer through the five floors of the main plant with its hundreds of machines operated by women on three shifts. "What we have done has been simply to use common sense in finding out the point of view of the women employe, putting ourselves in her place, figuring out what would naturally meet her special needs and be attractive to her.

In this we have held to three objectives for women at machines—safety, simplicity and ease of operation, and physical comfort."

Production departments in which the machines are operated by women include cut-off, milling, centerless grinding, center-type grinding, clearance grinding and point grinding. Girls handle inspection in all departments as well as final inspection.

In addition, women are going into other production departments. In the machine shop, two women have been trained and recently added to its force. In the heat-treating department, already some girls are employed to straighten drills as well as others who serve as inspectors. Engineers are now busy devising hoisting and conveying equipment and devices for protection against heat which are expected to render much more of the work of this department attractive to women. That is in prospect also in the forging department.

As to both special and standard machines, two general rules are followed here. One is to provide that in all departments where a girl operates only one machine she shall do so seated. Those operating two or more machines,

(*Please turn to Page* 100)

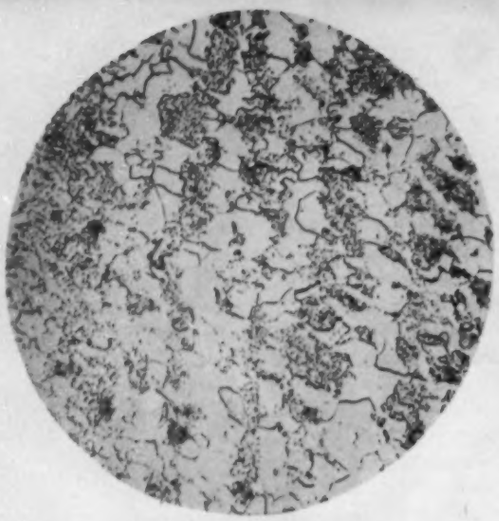
*Fig.* 1. (*Left, opposite page*)—*Point-grinding machines are fitted with a ball-bearing slide which was designed by Republic Drill engineers to make the work easy and safe. A special chuck is also employed. Figs.* 3, 4 *and* 5 *from Office of War Information*

*Fig.* 2. (*Right, opposite page*)—*Feature of operations handled by women at Republic Drill is clearance grinding. Here a battery of these units is in operation*

*Fig.* 3. (*Circled*)—*Women operator grinding milling machine cutters. Note protection supplied by sloping safety glass as well as goggles. Light bulbs are mounted at each side of safety glass to supplement overhead general lighting*

*Fig.* 4. (*Directly below*)—*These* 5-*spindle milling machines were especially designed for operation by women workers. Each woman keeps two to four of these machine running*

*Fig.* 5. (*Right*)—*The extension lever on this spinning lathe enables a girl of average strength to apply the high pressures required for these spinning operations without excessive effort. Similar provisions make operations easy on other machines*



## User Report No. 6 on Experience with . . .

# NE (National Emergency) ALLOY

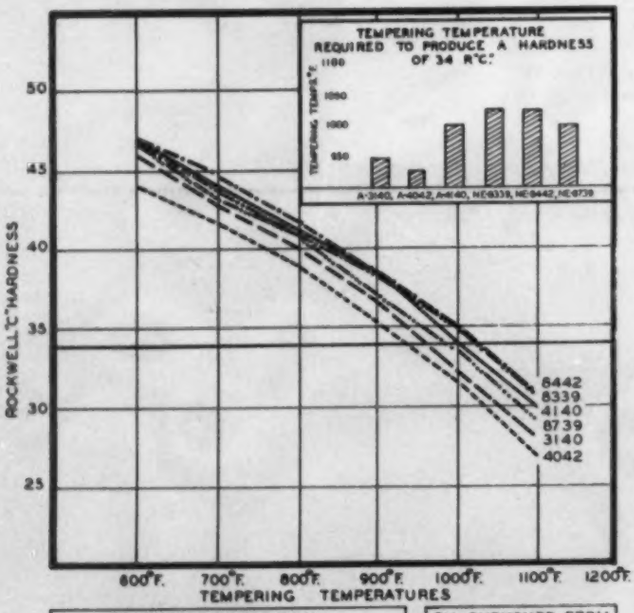
***Here are details of tests and applications of three medium carbon analyses in the NE-8000 series (NE-8339, NE-8442 and NE-8739) used as a material for capscrews. In first part of this article, STEEL, Dec. 7, 1942, p. 112, a similar study of some of the carburizing steels in the NE-8000 series was presented***

HEXAGON head bolts (cap screws) in sizes from ¼ to ¾-inch with either national fine or national coarse threads and up to 6 inches in length are generally made by cold heading cold-drawn wire. Fig. 2 shows a group of such bolts and also shows the various stages of manufacture by cold heading. AISI A-3140, A-4042 and A-4140 steels have been commonly used for bolts where an alloy steel has been specified.

The first requirement of a substitute steel is its ability to be produced in the form of cold-drawn wire. Production of such wire first involves rolling from billets to hot-rolled wire, which is then annealed at 1320 to 1380 degrees Fahr. to produce a completely spheroidized structure or a partly spheroidized pearlite as illustrated in Fig. 1. This hot-rolled and annealed wire is cold drawn

*Fig. 1. (Left, above)—Micrograph showing spheroidized structure produced by annealing at 1300 degrees Fahr.; etched in Nital; 300 diameters*

*Fig. 2. (Immediate left)—Steps in making capscrews: Top, slug cut from cold-drawn wire; next, first step in cold heading—cone; next, headed blank; trimmed blank; trimmed and pointed blank; threaded bolt; heat-treated bolt*

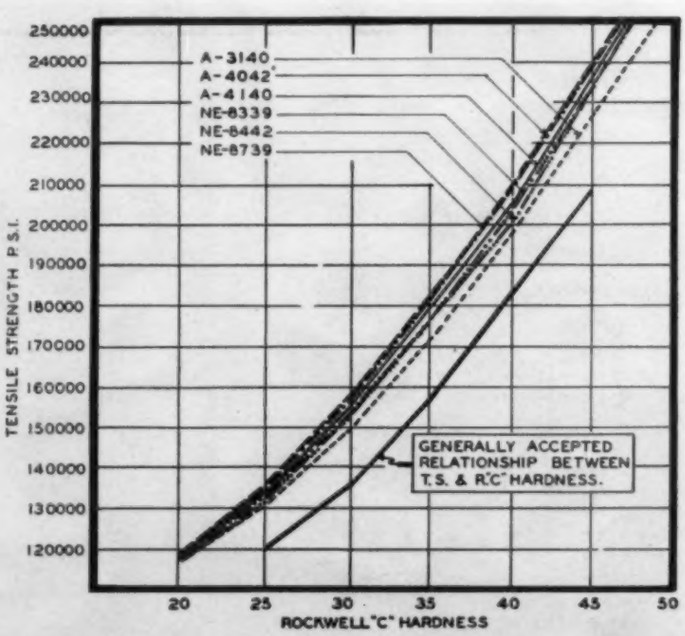



| CHEMICAL COMPOSITION | | | | | | | |
|---|---|---|---|---|---|---|---|
| STEEL | C | MN | SI | CR | NI | MO | AGS |
| A-3140 | .41 | .84 | .19 | .60 | 1.27 | | 8 |
| A-4042 | .44 | .85 | .28 | | | .22 | 7 |
| A-4140 | .42 | .77 | .28 | 1.00 | | .24 | 7 |
| NE-8339 | .40 | 1.59 | .29 | | | .28 | 7 |
| NE-8442 | .44 | 1.35 | .28 | | | .33 | 7 |
| NE-8739 | .41 | .93 | .24 | .52 | .53 | .28 | 7 |

OIL QUENCHED FROM 1525-1550 °F IN .525" TEST BAR SIZE

*Fig. 3. (Left, below)—Effect of temperature on hardness of A-3140, A-4042, A-4140, NE-8339, NE-8442 and NE-8739*

*Fig. 4. (Directly below)—Hardness versus tensile strength for the same six steels in Fig. 3*



# STEELS

By A. S. JAMESON
*Works Metallurgist*
West Pullman Works
International Harvester Co.
Chicago

to size variation of plus or minus 0.003-inch and coiled for use in cold-heading machines. The preferred hardness of the wire is less than 96 rockwell B with a maximum tensile strength of 110,000 pounds per square inch and minimum reduction of area of 35 per cent.

The complete bolts are heat treated to within a hardness range of 30 to 38 rockwell C with a minimum yield point of 125,000 pounds per square inch and a minimum tensile strength of 140,000 pounds per square inch. These unit stress requirements are calculated on an area obtained from a diameter which is the mean between the basic minor diameter and the pitch diameter of the thread.

There is also a requirement of toughness which is difficult to reduce to actual values when the bolts themselves are the test piece. One requirement is a minimum elongation of ⅛-inch over the original length of the bolt; another is that the bolts when held in a vise and hammered must be capable of bending through an angle of 30 degrees in the threaded section before fracturing.

If the tests are made on a bolt of a given length and a given thread length so as to obtain in testing a gage length of 1½ inches, a certain percentage elongation value can be obtained, but it is considerably less than would be obtained in pulling a standard cylindrical test bar. Usually it is less than half the elongation obtained from a standard test bar.

**Physical Properties of Bolt Steels:** A comparison of the physical properties of NE-8339, NE-8442, NE-8739 and AISI A-4042, A-4140 steels as obtained from rolled billets follows, and Table I gives the chemical ranges of the six steels.

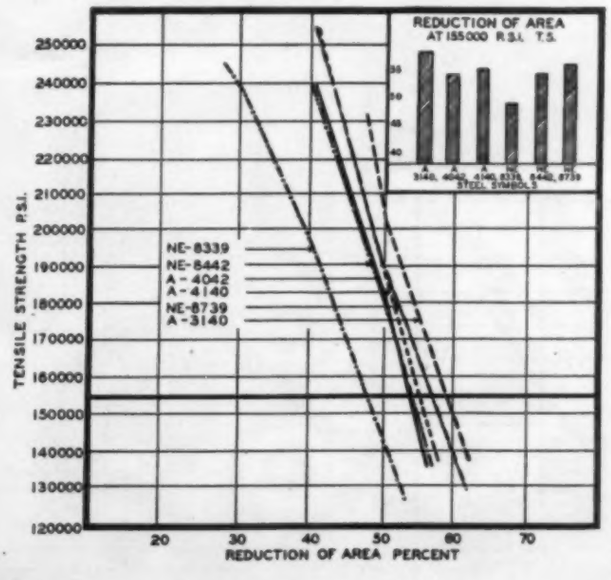
**Tensile Properties:** The tensile properties of 0.500-inch standard ASTM test bars heat treated by quenching from 1500 to 1550 degrees Fahr. in oil and tempering at various temperatures are shown in Figs. 3, 4 and 5. Fig. 3 illustrates the effect of the temperature on the hardness. It will be noted here that NE-8339 and NE-8442 require a higher tempering temperature to obtain a given hardness, with A-4140 and NE-8739 next, followed by A-3140 and A-4042. The average between the usually specified range of 30 to 38 rockwell C for bolts is taken as a basis for the comparison shown in the inset in Fig. 3.

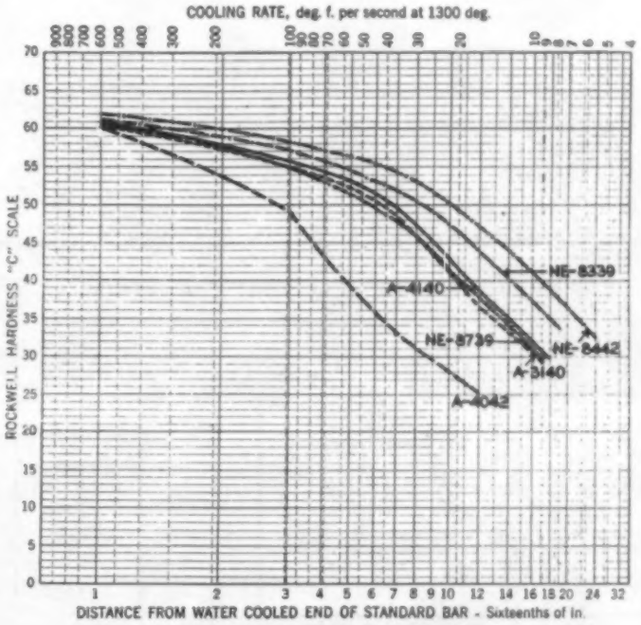
In Fig. 4, hardness is plotted against tensile strength. Note from Fig. 4 that the tensile strength for a given hardness for all the steels is approximately the same and that all are higher than the generally accepted line for this relationship. This indicates that the steels were fully hardened in quenching.

Relationship of tensile strength to reduction of area is a measure of the toughness of the alloy analysis. This relationship varies considerably from heat to heat and also depends on the location of the specimens from center to the outside of the bar. This relationship is shown in Fig. 5, which shows A-3140 to have the highest reduction of area value, based on 155,000 pounds per square inch — the tensile strength at 34 rockwell C (the average in the specified range for bolts of 30 to 38 rockwell C). Next come

*Fig. 5. (Left, below)—Tensile strength versus reduction of area for same six steels in Fig. 3*

*Fig. 6. (Right)—End-quench hardenability tests*




STEEL ANALYSES & QUENCHES

| STEEL | C | M | Si | NI | CR | MO | A.G.S. | QUENCHING TEMPERATURE | NO. OF HEATS TESTED |
|---|---|---|---|---|---|---|---|---|---|
| A-3140 | .39 | .71 | .25 | 1.32 | .65 | | 7 | 1550 | 5 |
| A-4042 | .44 | .80 | .24 | | | .23 | 7 | 1550 | 1 |
| A-4140 | .41 | .76 | .26 | | .98 | .23 | 7 | 1550 | 6 |
| NE-8339 | .42 | 1.49 | .33 | | | .28 | 8 | 1550 | 1 |
| NE-8442 | .45 | 1.38 | .27 | | | .34 | 7 | 1550 | 1 |
| NE-8739 | .42 | .91 | .30 | .58 | .51 | .28 | 7 | 1550 | 1 |

**TABLE I—Chemical Ranges of the Six Steels, in Per Cent**

| AISI Steel Symbol | Alloy Class | Carbon Min. | Carbon Max. | Manganese Min. | Manganese Max. | Silicon Min. | Silicon Max. | Nickel Min. | Nickel Max. | Chromium Min. | Chromium Max. | Molybdenum Min. | Molybdenum Max. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A-3140 | Nickel-Chromium | 0.38 | 0.43 | 0.70 | 0.90 | 0.20 | 0.35 | 1.10 | 1.40 | 0.55 | 0.75 | ... | .. |
| A-4042 | Molybdenum | 0.40 | 0.45 | 0.75 | 1.00 | 0.20 | 0.35 | ... | ... | .. | .. | 0.20 | 0.30 |
| A-4140 | Chromium-Molybdenum | 0.38 | 0.43 | 0.75 | 1.00 | 0.20 | 0.35 | ... | ... | 0.80 | 1.10 | 0.15 | 0.25 |
| NE-8339 | Manganese-Molybdenum | 0.37 | 0.42 | 1.30 | 1.60 | 0.20 | 0.35 | ... | ... | ... | ... | 0.20 | 0.30 |
| NE-8442 | Manganese-Molybdenum | 0.40 | 0.45 | 1.30 | 1.60 | 0.20 | 0.35 | ... | ... | ... | ... | 0.30 | 0.40 |
| NE-8739 | Nickel-Chromium-Molybdenum | 0.35 | 0.40 | 0.70 | 0.90 | 0.20 | 0.35 | 0.40 | 0.60 | 0.40 | 0.60 | 0.20 | 0.30 |

Sulphur and phosphorus—0.04 maximum.

These steels are all manufactured to produce a fine austenitic grain size up to 1700 degrees Fahr. after 8 hours at heat.

**TABLE II—Minimum Tensile Specifications for Medium-Carbon Alloy-Steel Bolts**

| Bolt Size (Inch) | *Cross Sectional Area of Thread, Sq. Inch | National Coarse Thread Yield Point, (Pounds) | National Coarse Thread Tensile Strength, (Pounds) | National Fine Thread Yield Point, (Pounds) | National Fine Thread Tensile Strength, (Pounds) | Equivalent Unit Strength Yield Point (Psi) | Equivalent Unit Strength Yield Point (Psi) |
|---|---|---|---|---|---|---|---|
| ¼ | 0.0318 | 3,860 | 4,280 | 4,610 | 5,100 | 125,000 | 140,000 |
| 5/16 | 0.0525 | 6,480 | 7,180 | 7,410 | 8,200 | 125,000 | 140,000 |
| ⅜ | 0.0775 | 9,690 | 10,730 | 11,400 | 12,620 | 125,000 | 140,000 |
| 7/16 | 0.1063 | 13,300 | 14,730 | 15,370 | 17,020 | 125,000 | 140,000 |
| ½ | 0.1419 | 17,860 | 19,780 | 20,920 | 23,160 | 125,000 | 140,000 |
| 9/16 | 0.1819 | 23,000 | 25,450 | 26,570 | 29,420 | 125,000 | 140,000 |
| ⅝ | 0.2260 | 28,620 | 31,700 | 33,730 | 37,340 | 125,000 | 140,000 |
| ¾ | 0.3345 | 38,800 | 44,500 | 43,300 | 49,600 | 116,000 | 133,000 |
| ⅞ | 0.4618 | 53,550 | 61,400 | 59,100 | 67,800 | 116,000 | 133,000 |
| 1 | 0.6057 | 70,200 | 80,600 | 78,900 | 90,400 | 116,000 | 133,000 |

*Calculated on the basis of a diameter half way between the pitch and the basic minor diameter.

**TABLE III—Maximum Bar Sizes to Which Tensile Properties of Figs. 3, 4 and 5 Apply**

| AISI Steel No. | Hardenability J-50 in Sixteenths | Approximate Cooling Rate Degrees Per Second at 1300 Degrees Fahr. Taken from Fig. 6 | Maximum Bar Size to Which Tensile Properties (Nearest ¼-Inch) (Oil Quenched) Would Apply |
|---|---|---|---|
| A-3140 | 6 | 40 | 1¼ |
| A-4042 | 3 | 100 | ½ |
| A-4140 | 7 | 40 | 1¼ |
| NE-8339 | 8 | 30 | 1½ |
| NE-8442 | 10 | 20 | 1¾ |
| NE-8739 | 6 | 40 | 1¼ |

NE-8739, A-4140, A-4042, NE-8442 and NE-8339.

This is in line with the commonly accepted view that steels containing nickel have higher elongation and reduction of area values for a given tensile strength and that those containing higher percentages of chromium and especially manganese have an adverse effect on these values for a given tensile strength.

We can assume that this tensile data is good for sections up to 0.5-inch. We must turn to hardenability tests to find out to what larger sections this data can be applied.

**Hardenability:** Fig. 6 gives the relative hardenability of the six steels. Based on the desirability of having a hardness of 50 rockwell C after quenching, the properties given in Figs. 3, 4 and 5 would apply to the sizes shown in Table III.

**Physical Properties of Bolts:** The physical properties are now given for ½ x 1½ national-course thread hexagon-head bolts (cap screws) heat treated by quenching from between 1525 and 1550 degrees Fahr. in oil from a controlled-atmosphere continuous-belt type furnace and tempering from 800 to 1200 degrees Fahr. at intervals of 50 degrees Fahr.

To insure the maximum physical properties all bolts must quench out to at least 50 rockwell C. The variation from readings taken on the surface and at the center of the threaded section of the same bolt must also be no more than 2 points rockwell C. It is usual to specify the minimum strength of bolts in pounds for each size and thread and not in unit stress value.

Recommended minimum tensile specifications for alloy bolts up to 1-inch in size are listed in Table II. These minimum values can be obtained with a hardness taken on the lightly ground surface of the threaded end of the bolt of 28 rockwell C, but 30 rockwell C is a safer minimum hardness value.

In Fig. 7, hardness is plotted against

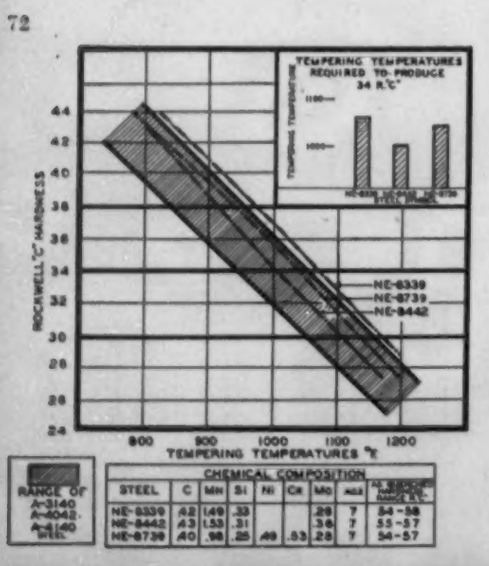
(*Please turn to Page* 107)

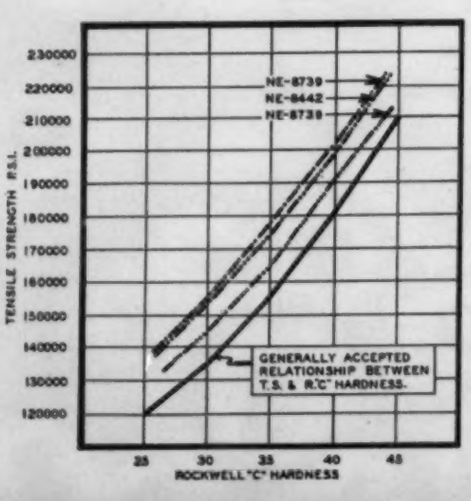
*Fig. 7. (Left, below)—Effect of tempering temperature on hardness of ½-inch national-coarse-thread hexagon-head bolts when quenched in oil from 1525 degrees Fahr. and tempered as indicated*

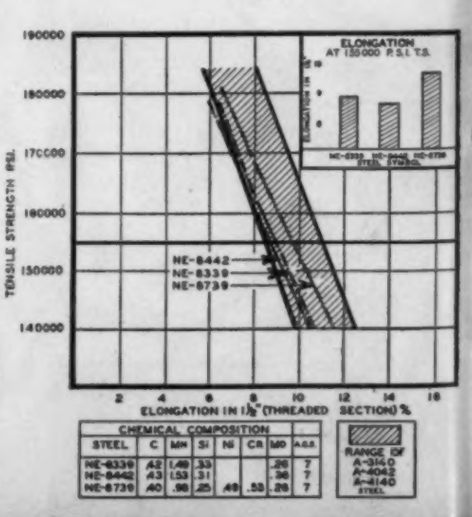
*Fig. 8. (Center)—Tensile strength versus hardness of same type bolts as Fig. 7, same three steels*

*Fig. 9. (Right)—Tensile strength versus elongation of same type bolts as Fig. 7, same three steels. Tensile strengths calculated from an area of 0.1419-square-inch*




TEMPERING TEMPERATURES REQUIRED TO PRODUCE 34 R.'C'
ROCKWELL "C" HARDNESS
TEMPERING TEMPERATURES °F
NE-8339
NE-8739
NE-8442
RANGE OF A-3140 A-4042 A-4140 STEEL
CHEMICAL COMPOSITION
STEEL C MN SI NI CR MO AGS AS BRINELL HARDNESS
NE-8339 .42 1.49 .33 .29 7 54-58
NE-8442 .43 1.53 .31 .36 7 55-57
NE-8739 .40 .98 .25 .49 .53 .28 7 54-57





ELONGATION AT 130000 P.S.I. T.S.
TENSILE STRENGTH P.S.I.
ELONGATION IN 1½" (THREADED SECTION) %
NE-8442
NE-8339
NE-8739
CHEMICAL COMPOSITION
STEEL C MN SI NI CR MO AGS
NE-8339 .42 1.49 .33 .29 7
NE-8442 .43 1.53 .31 .36 7
NE-8739 .40 .98 .25 .49 .53 .28 7
RANGE OF A-3140 A-4042 A-4140 STEEL

*Keep both of them on the job . . .* The man on the firing line joins the man on the production line in looking to "A. W." Rolled Steel Floor Plate for skid-proof protection against costly disabilities. Diamond-shape projections give maximum traction. No worn or slippery surfaces. Easy to clean, quick to drain. No maintenance expense—"A.W." Floor Plate is safe *permanently.*

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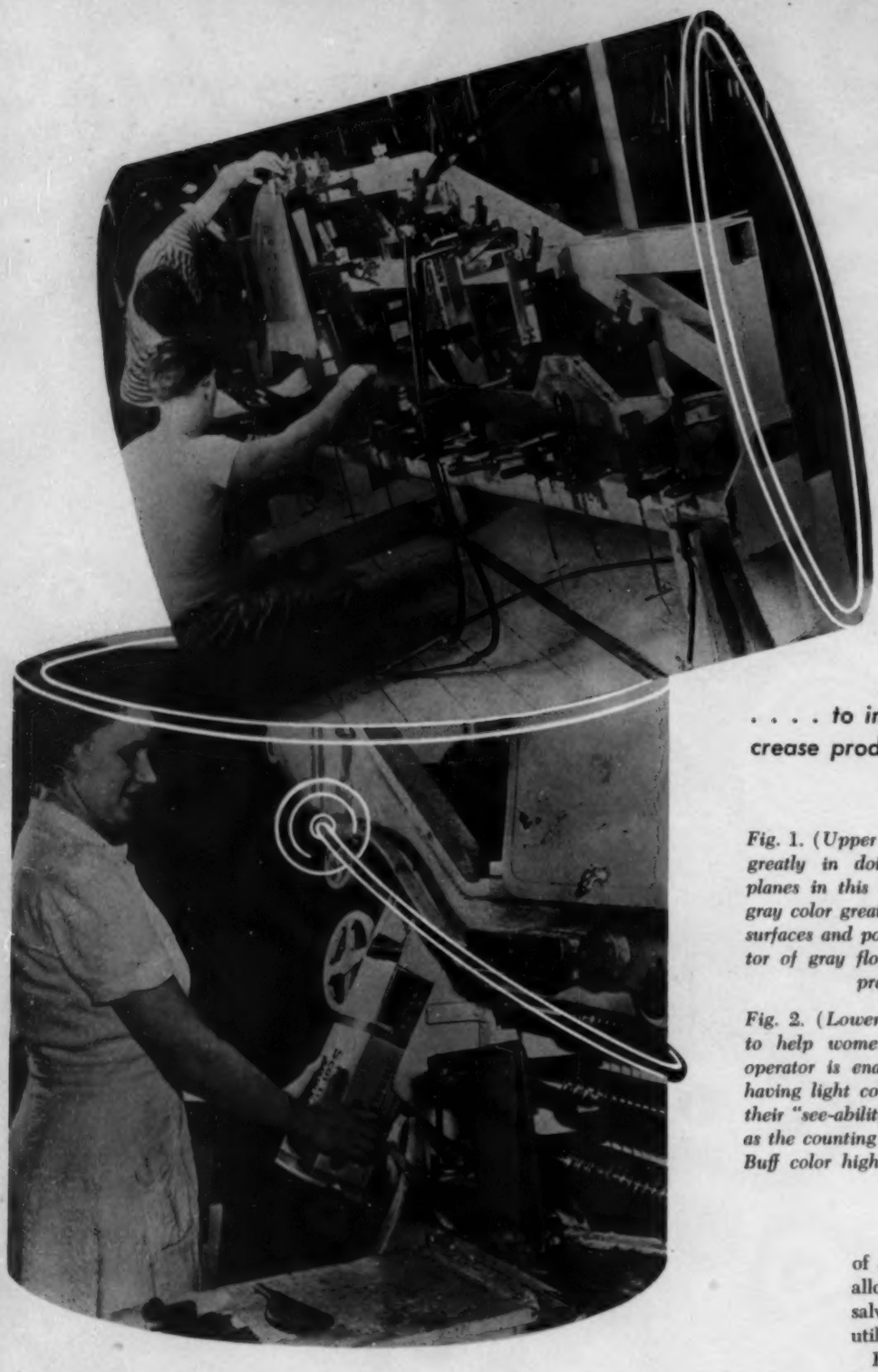
Courtesy U. S. Army
Signal Corps

# Co-ordinates PAINT and LIGHT



**. . . . to improve working conditions, increase production**

*Fig. 1. (Upper left)—This shows how paint can help greatly in doing a job. In assembling parts of planes in this special jig, painting the floor a light gray color greatly increased the illumination on under surfaces and portions near floor level. Reflection factor of gray floor is 60 per cent, much higher than previously thought practical*

*Fig. 2. (Lower left)—Proper painting can do much to help women and new workers. Here the girl operator is enabled to work safely and quickly by having light colors on the machine parts to improve their "see-ability". Red is used at such danger points as the counting device near the operator's right hand. Buff color highlights guards, wheels and other parts in working area*

CREATION of favorable color contrasts in the immediate vicinity of work for machine-tool operations by painting machines and parts in three-dimensional colors, adopted by many industrial plants, is helping to obtain improved efficiency, safety and maximum comfortable visibility for increased production. In United States armories and arsenals, where three-dimensional spotlighting is now widely practiced with light colored paints of contrasting hues, efficiency has been raised 15 per cent in some cases—notably at Watervliet, N. Y.

Extending further the possibilities of correct finishes as an aid to effective seeing not only on the machine itself but also throughout entire room or plant, Matt Denning, E. I. du Pont de Nemours & Co., Wilmington, Del., with Arthur A. Brainerd and Robert A. Massey of Philadelphia Electric Co., Philadelphia, have compiled data showing how the scientific use of color makes it practical to increase the illumination from most lighting systems by 100 per cent without changing the equipment or increasing lamp wattage. Intelligent selection of color hues for any specific seeing job allows light formerly wasted to be salvaged and directed where it can be utilized.

By planned use of all available reflecting surfaces in a room or department, it is generally possible to get at least 100 per cent more light for each watt consumed. By treating ceilings, walls and floors with contrasting hues, this improvement can be achieved without great expense and maintained without changing equipment. Adequate contrast for efficient and comfortable vision must be attained through more of a contrast in "hue" than in "brightness".

There is no one best answer for the spotlight color problem, but extensive tests favor buff as a working color for

(*Please turn to Page* 108)

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# Industrial "TAXI" Service

By GEORGE E. STRINGFELLOW
*Division Manager*
Storage Battery Division
Thomas A. Edison Inc.
Orange, N. J.

***Central dispatching system provides prompt delivery and pick-up facilities throughout all portions of huge plant with many separate buildings and departments***

*Fig. 4—Industrial "taxi" picks up a "fare". Skid is welded from heavy sheet steel to form a shallow tray resting on an inverted "U", reinforced by side straps*

*(Concluded from Last Week)*

IN SHOPS devoted to the manufacture of heavy machinery, a fleet of industrial trucks is organized to provide what the management has appropriately described as an industrial "taxi" service. Here the shops, located in bays and galleries adjacent to erection floors, are engaged in a very wide variety of work. Each shop, while generally operating on certain products, has variations in these in size and type. For these reasons, it has been found very difficult to provide regularly scheduled deliveries and pick-ups which would always meet the best convenience of production.

Therefore, a truck dispatching system has been set up which furnishes prompt delivery and pick-up service at the request of the individual shop foreman, provides direct lines of travel between origin and destination, yet results in very little truck travel without load. In operation the system is extremely simple, and is supervised by one dispatcher.

A foreman having work to go out simply telephones the dispatcher for a truck, and each truck operator phones the dispatcher as he completes each delivery. The dispatcher in turn sends the operator to the nearest department requesting truck service. He maintains a running record of all requests for service, stamping each record with the time it was received and the time a truck was sent, together with the truck number. This record indicates that in most cases, trucks are located and dispatched in less than 5 minutes from the time the requests are received. The record also shows the calls made and the trips completed by each truck.

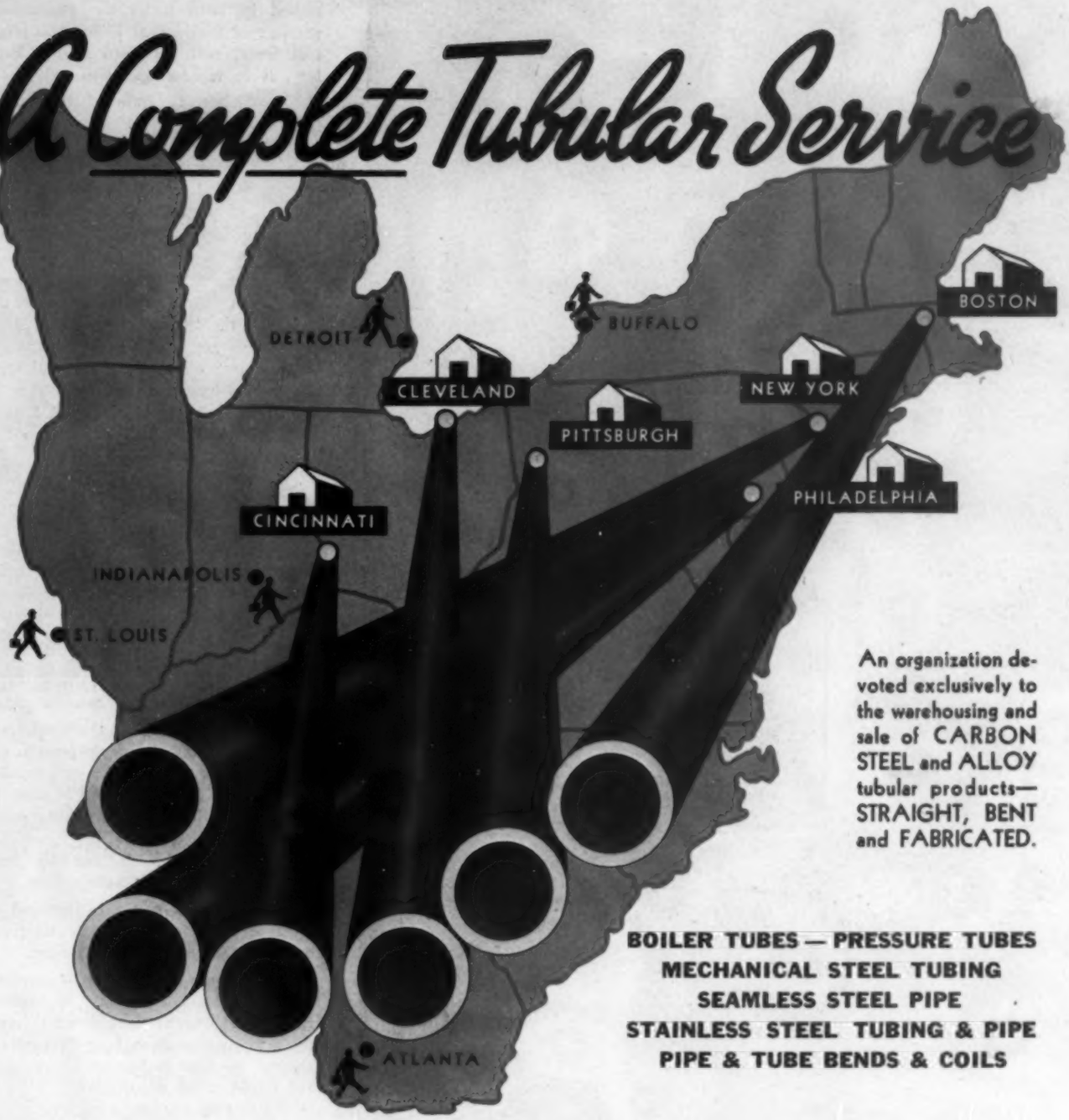
Formerly, the trucks were assigned to the individual departments. As has generally been the experience of other plants, the result too often was idle trucks in some departments and overworked trucks in others. The principal obstacle to the adoption of centralized control was the fear by the foremen that trucks might not be available promptly, but this has been overcome by the highly satisfactory performance of the dispatch system. The overall result has been a marked increase in the utilization of the trucks, without which it would be impossible to handle the present tonnage.

The skid containers are provided with lifting ears so they can be handled by overhead traveling cranes, with which all the shops are equipped.

In the erection and assembly areas, virtually all parts are delivered in skid containers by lift truck.

Use of battery industrial trucks is by no means new in the plant. As a matter of fact, the first truck was in-

# A Complete Tubular Service

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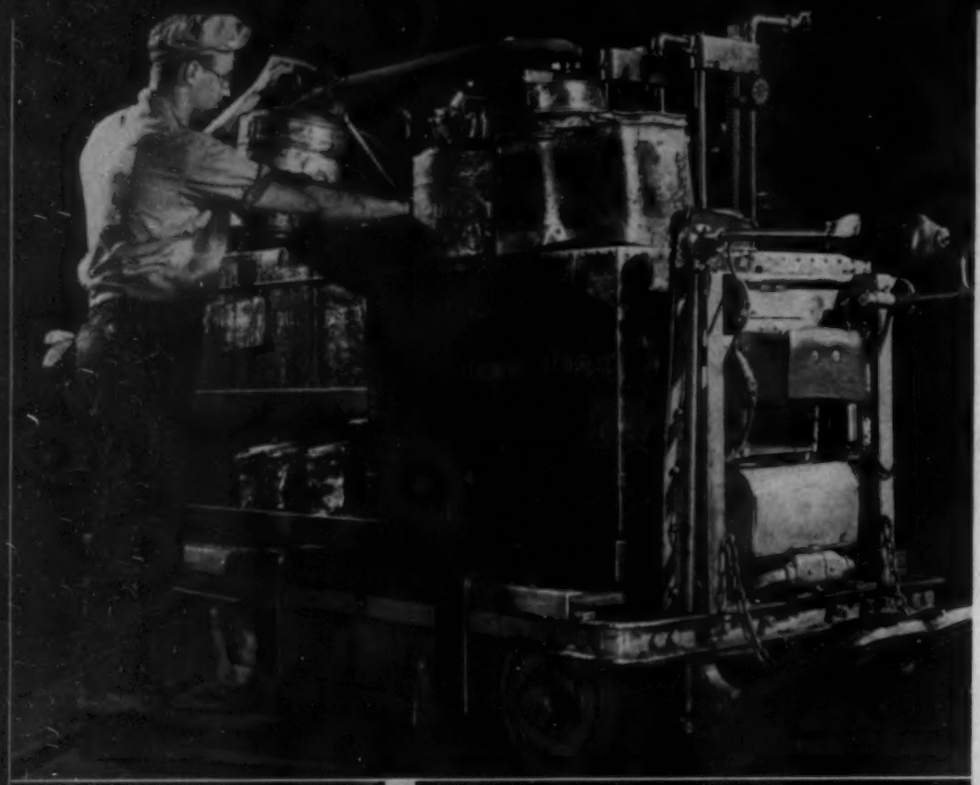

*Fig. 5. (View above)—One of the specialized jobs performed by battery-driven industrial trucks in this plant is delivery of oil to 22 tool rooms throughout the shops. Note specially constructed skid with provision for holding the three large tanks with individual metering pumps as well as other small tanks and cans*

*Fig. 6. (Lower view)—In the tractor shop, materials are moved through process in skid boxes like those shown here. They are easily tiered for storage since the corner fittings are specially designed for interlocking. All photos from Storage Battery Division, Thomas A. Edison Inc., Orange, N. J.*

stalled in 1916 under the production pressure of World War I; and this original truck, with its third storage battery, is in regular operation today.

Nevertheless, in spite of the many years industrial trucks have been in operation, new ways to use them to save time and motions are still being discovered. A good example is the transfer of sheared sheet stock from the annealing to the sheet-metal departments.

This material, in lots of approximately 4 tons, was formerly moved on rail cars, the trip requiring an average of approximately two hours due mainly of time lost waiting at junction points for motive power to arrive. Now it is handled in two skid loads of 2 tons each in approximately 5 minutes by the industrial taxi service.

One of the outstanding features of the industrial taxi service is its dependability. Neither the trucks nor the batteries require any appreciable time out of service for repairs. For example, the records show that the trucks averaged a total of only 8 hours' lost time per truck for repairs during the entire year of 1941.

Battery exchange and charging stations are located at five different points throughout the plant, an overhead traveling crane being the most common exchange equipment. Both 21-cell and 24-cell batteries are in use, and in some of the stations they are charged in series (four 21-cell batteries or three 24-cell batteries) through resistors from 250-volt direct-current shop lines.

Welder outfits are also provided at some of the stations with charging circuits for from one to six batteries.

The industrial trucks also perform numerous specialized jobs throughout the plant. One of these is oil delivery to 22 tool rooms throughout the machine shops. Another is furnace charging in the heat-treating department.

## Molded Fabric Bearing Aids Metal Situation

An oil-lubricated, nonmetallic molded bearing, Lubritex, developed by Gatke Corp., Chicago, is reported to be aiding considerably in overcoming the shortage of critical bearing metals. According to the manufacturer, it is giving highly satisfactory results in all kinds of service.

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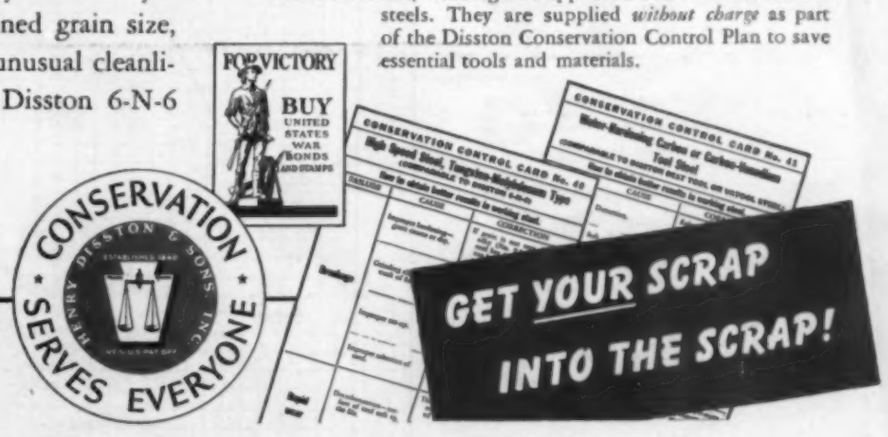


# flash Welding of Aircraft

*structural sections made by assembling parts of X-4130 steel by resistance welding*

THE WORK reported here was carried on for the purpose of establishing the butt flash welding of X-4130 steel as a production process for the joining of structural assemblies for aircraft.

Welding machine settings were established for various sizes of X-4130 steel tubing throughout the range of the 100-kilovolt-ampere machine in the Lockheed laboratory. The weld quality and consistency produced by these settings were checked by physical testing. These data are presented as curves so that any cross-sectional area, wall thickness or diameter of tubing (within the capacity of the machine) can be welded by referring to these curves for the proper settings.

It is concluded that butt flash welding is a satisfactory production process for the joining of X-4130 steel in structural assemblies for aircraft.

From the results obtained, butt flash welding is deemed a satisfactory and desirable production process for welding X-4130 steel in aircraft structural assemblies because it offers the following advantages:

—Good consistency.

—Weld strength equal to that of the tube itself (in tension).

—Cost economy.

—Weight economy.

—Close tolerances and elimination of warping.

—Possibility of "finish machining" parts prior to welding.

—Since the process is semi-automatic, less skilled operators are required.

By R. P. DELLA-VEDOWA
*Research Engineer*
Lockheed Aircraft Corp.
Burbank, Cal.

**Description of Process:** Flash welding is a method of joining metal parts by means of the heat generated due to the passage of current in the form of a series of small arcs across a short gap between the surfaces to be welded.

The parts to be welded are held in dies and butted together in the welding machine. Current is passed through the parts between the electrodes (dies) and the flashing cycle begins. During the flashing operation the parts are brought together at a rate equal to the loss due to the "burn off" during flashing. The flashing operation brings the ends of the parts up to a temperature (in a predetermined time) sufficient to cause a thin film of molten metal to exist at the point of flashing. This film is backed up for a very short distance by metal in the plastic state. When this condition is reached, the force exerted on the parts is suddenly increased, thus forging the ends together. This forging pressure causes the molten film to be exuded and

From a paper published in *The Welding Journal* of September 1942.

*Left and Top—Three arc-welded parts with equivalent resistance welded units*

*Fig. 1—Flashing time plotted against tubing wall thickness*

*Fig. 2—Transformer tap settings plotted against tubing area welded*

*Fig. 3—Time interval between current cut-off and start of upset is here plotted against current cut-off settings*

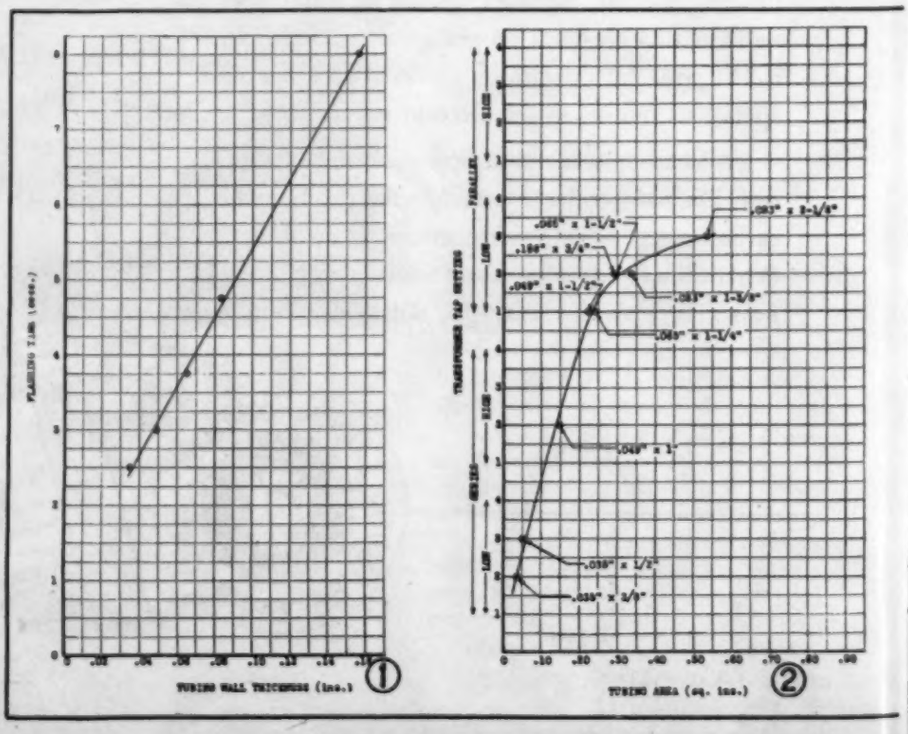
*Fig. 4A — Diagrammatic sketch of flash welding cycle*

*Fig. 4B—Typical oscillogram showing current, voltage and die travel*

*Fig. 5—Time interval plotted against tubing area*

*Fig. 6 — Machine setting plotted against tubing wall thicknesses up to 0.22-inch*

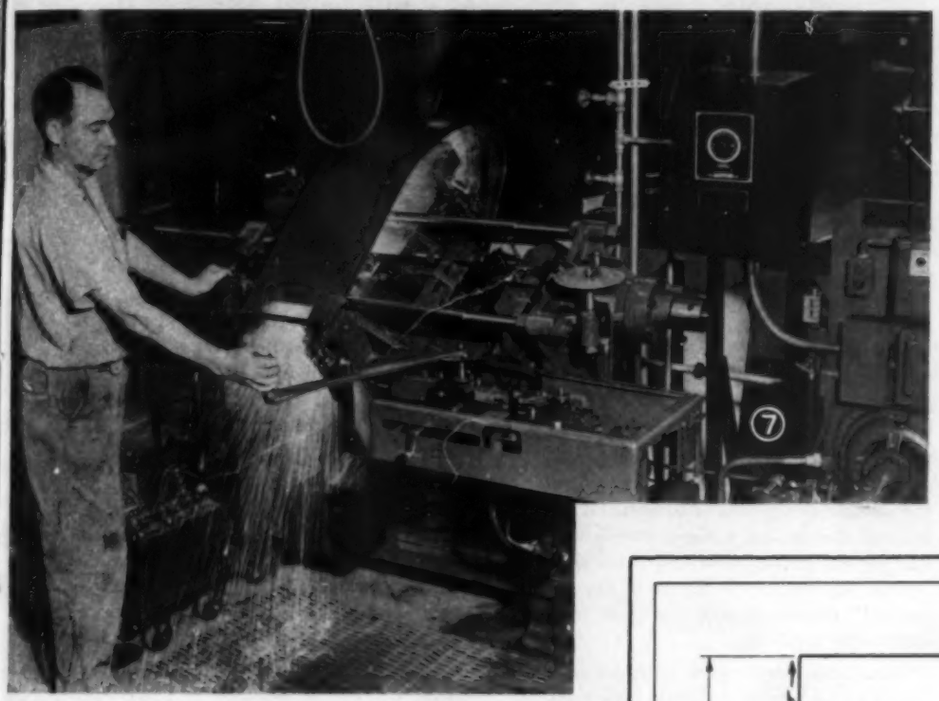
*Fig. 7—Flash welder in operation on X-4130 steel parts*

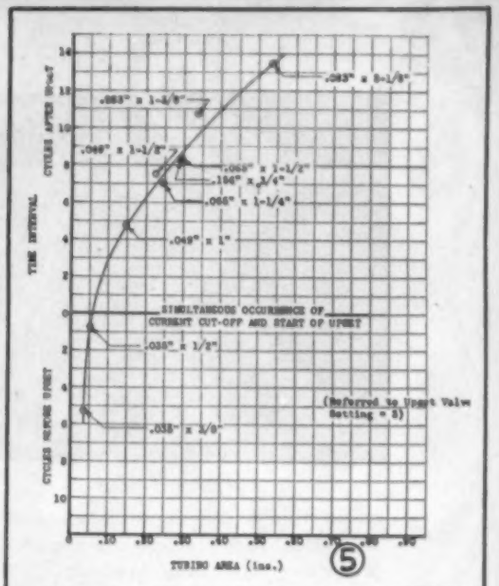


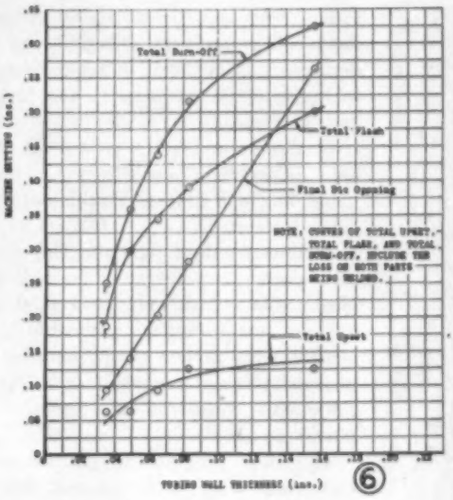
the plastic metal is forged together in a weld. Fig. 7 shows a flash welder in operation.

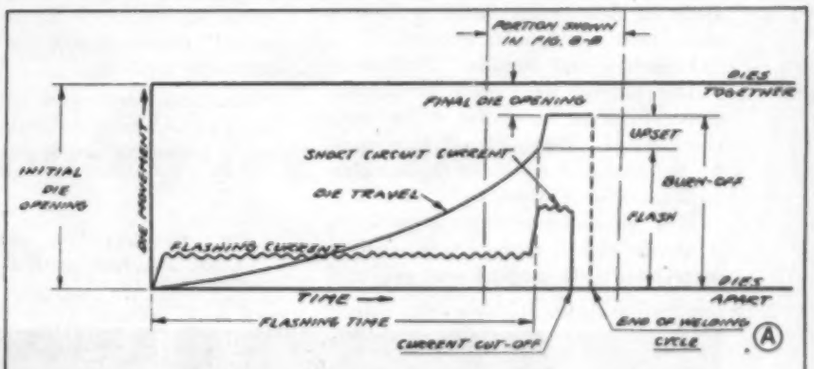
Flash welding is unlike arc or torch welding in that the weld is composed of metal from the parts themselves rather than from the foreign material added in the weld bead, and thereby results in a forged, rather than a cast structure. Figs. 8 and 9 are macrophotographs of sections through typical flash welds.

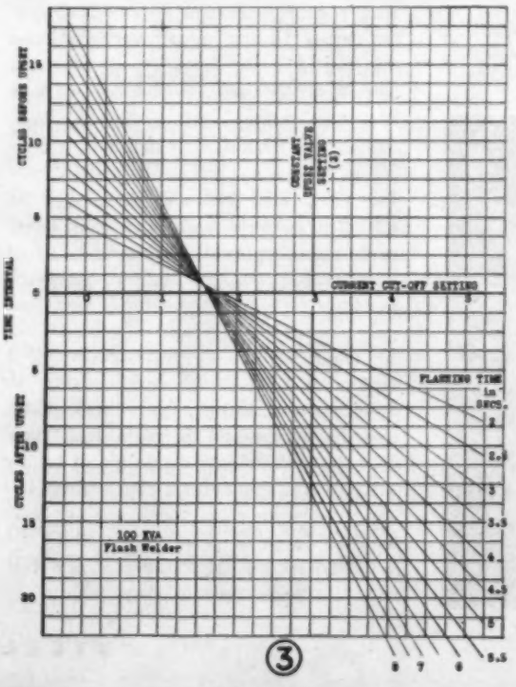
**History of Development:** The butt welding process has been in fairly common use in the automotive and other industries. In the aircraft industry, however, its use to date has been somewhat retarded by the difficulties inherent in applying it to the chromium-molybdenum (X-4130) steel used so extensively in aircraft structures. This steel has a pronounced tendency to air-harden and so becomes brittle in the region affected by the weld heat unless special care is taken to prevent this effect. To date,

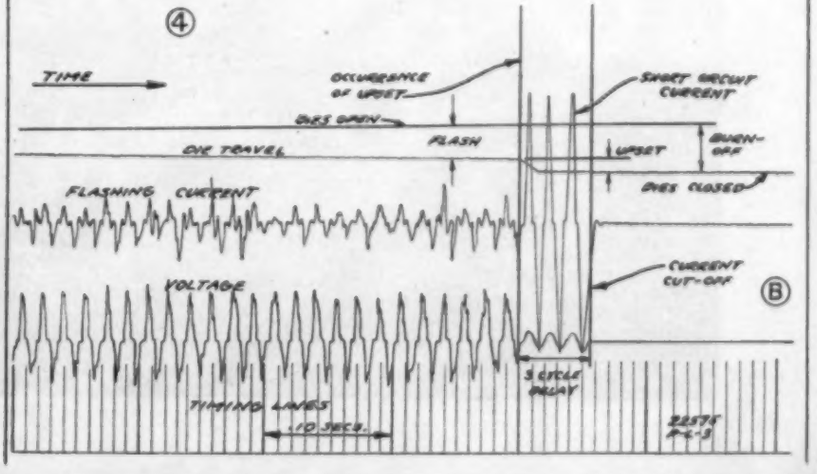




MACHINE SETTING (ins.)
Total Burn-Off
Total Flash
Final Die Opening
NOTE: CURVES OF TOTAL UPSET, TOTAL FLASH, AND TOTAL BURN-OFF, INCLUDE THE LOSS OF BOTH PARTS BEING WELDED.
Total Upset
TUBING WALL THICKNESS (ins.)
⑥



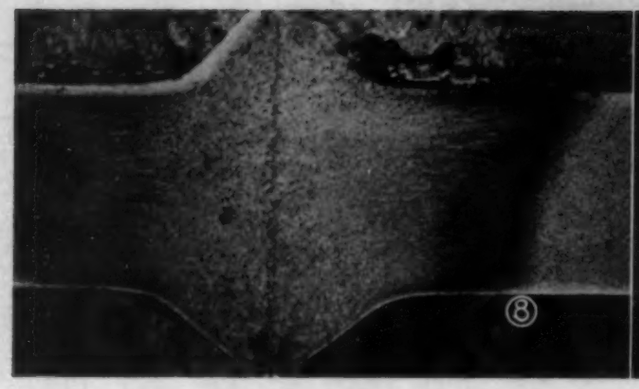


*Fig. 8—Section through typical flash weld; note fine grain structure*

*Fig. 9—Section through typical flash weld; note how poor grain structure have been squeezed out into the flash*

no satisfactory process specifications, design information, or test and inspection procedures have been available.

The test and development program described in the present report was undertaken at Lockheed in recognition of the possibilities inherent in the process and in response to numerous requests from design and shop groups for specific information on strength, consistency, machine settings, equipment characteristics, etc.

**Preliminary Investigation:** The results of a preliminary investigation indicated clearly that if flash welds in X-4130 steel are not made under reasonably good control with proper setups checked by physical testing, the results will not be sufficiently consistent for structural applications.

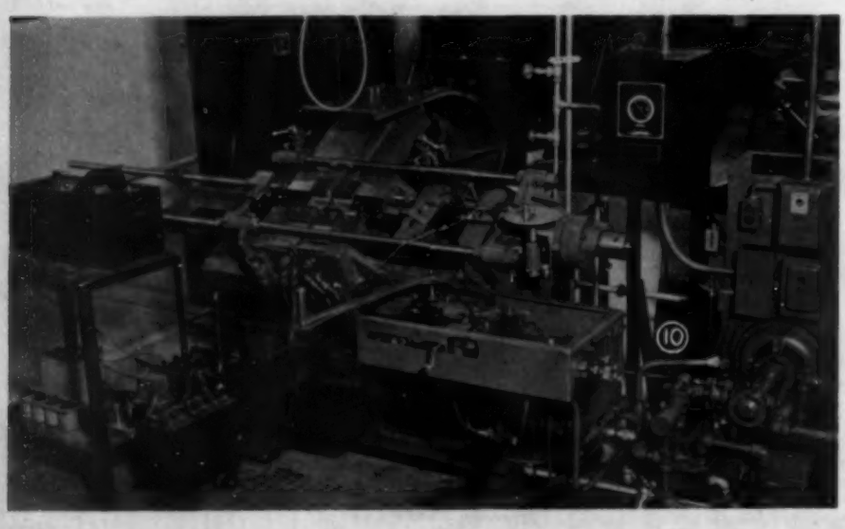
This test program is not so much concerned with basic research on the flash welding process as with the specific study of flash welds made in X-4130 steel—mostly in tubular sections.

**Procedure and Results:** Preliminary welder settings were made for various sizes of tubing, and the welds were check tested. These settings were made by the trial and error method since no basic data were available.

First, an initial setting was made on a specific size of tubing, then variables were adjusted to produce what appeared to be a satisfactory weld. Several welds were then made, and for each size certain settings in the immediate range were changed. After these welds were tested, four or five more specimens were made at the setting which gave the best results. If these check specimens proved to be good, a consistency run of 25 welds was made to establish the weld quality obtainable. In all cases, the flash was ground off on the outside of the tubing to within 1/64-inch of the tubing surface, but left intact on the inside. The welds for these consistency runs were tested in the "as-welded" condition with no heat treatment after welding.

These check tests were made for combinations of diameters and wall thicknesses falling within the range of the machine.

*Fig. 10—Recording oscillograph shown attached to flash welder for testing*



An investigation was made of the effect of normalizing after welding. Tests were made of local normalizing of the weld area using an induction machine; also general normalizing of the welded tests have shown that welds normalized *after* welding do not develop higher strength characteristics than welds made in normalized tubing and tested in the "as-welded" condition.

**Preliminary curves** (Figs. 1, 2 and 6) have been plotted to show the machine settings as functions of wall thickness and/or total cross-sectional area. With the establishment of such data, any combination of tubing dimensions within the range of the machine can be satisfactorily welded.

Die openings and burn-off of parts (flash plus upset in inches, as well as the flashing time, were determined to be functions of the tubing wall thickness. The upset and clamping pressures, and the current (determined by transformer tap setting and heat control setting), are functions of the cross-sectional area of the tubing (see Fig. 4A). Therefore, any combinations of wall thickness and tubing diameter having equal areas require the same transformer tap setting. Likewise, regardless of area or outside diameter, tubes having equal wall thickness require the same die openings, burn-off and flashing time.

In establishing settings for this machine, it is desirable to maintain a consistent increase in the value of each variable as the wall thickness and area of the tubing to be welded are increased. However, there are probably several sets of settings that could be made on any such machine to weld satisfactorily one specific size of tubing; and advantage can be taken of this fact in developing a comprehensive set of curves to fit all cases. For example, three check points may be determined to establish a tentative curve showing the relation of tubing area to the transformer tap setting; but exact adherence to these settings may not be essential if other variables are adjusted accordingly. Hence, a new tub-

(*Please turn to Page* 93)

# Air Conditioning for a rivet

## . . . and YOU!

Silly? To air condition rivets? Not at all. When aluminum rivets are cooled to sub-zero temperatures they can be riveted faster and more perfectly . . . *speeding up airplane production.*

Many of us think of air conditioning only in terms of comfort for human beings. Yet today, air conditioning's most important job is to keep the *machines* and *materials* of war industry at desired temperatures and humidities.

To meet these wartime needs, revolutionary advances in air conditioning technique have been made. Temperature and humidity are maintained *far more exactly* than ever before. Equipment is more compact, more flexible.

With the coming of peace, this experience will be applied to the making of improved air conditioning equipment for all sorts of uses.

*Packaged* air conditioners will be smaller, more compact, more economical—many more homes will have them. And in offices and factories, air conditioning will lower costs and increase efficiency. General Electric will be a logical source of all types of this new equipment for air conditioning, refrigeration, heat transfer and heating.

*Air Conditioning and Commercial Refrigeration Department, Division 422, General Electric Company, Bloomfield, New Jersey.*

*Air Conditioning by*

**GENERAL ELECTRIC**

# Film Refining Process OF STEELMAKING

*(Concluded from Last Week)*

THIS NEW process can easily be applied to the production of all grades of steels and economically adapted to any desired schedule of production. It can help to speed-up and increase production from existing melting furnaces and it can make available a large and new steel production from existing cupolas.

Production of the molten metal to be refined being the first consideration, the principal sources of molten iron or steel in the approximate order of cost of melting, are as follows:

Blast furnaces producing molten iron from iron ore reduction.
Cupolas used for melting pig iron or a mixture of pig iron and steel.
Open-hearth (Siemens-Martin) furnaces.
Electric arc furnaces.
High-frequency induction furnaces.

This shows two main classes of molten material to be refined into finished steel of various compositions, namely, molten iron from blast furnaces or cupolas and molten steel from various furnaces.

Most of the steel now in use comes originally from iron produced in blast furnaces. It is unquestionable that this molten pig iron should be directly transformed into steel and the steel directly cast into ingots, slabs, bars or billets or into sand molds. After rolling, a percentage of this steel will form steel scrap which has to be remelted. A cupola will cheaply melt pig iron or a mixture of pig iron with a large percentage of scrap. The resulting molten cast iron will be obtained in desired batches of 1, 2, 5 or more tons or even continuously. This is a rapid economical and convenient way of melting materials for steelmaking. The molten cast iron produced by the cupola, under the film-refining process, would be directly transformed into steel of the required composition and cast either in sand molds or into molds for ingots, slabs, bars, billets or continuous plates, strips or seamless pipes with the use of the film-impact casting method.

The two methods, now available, to make steel out of molten iron are oxidation by an air blast or by means of oxidizing slags. The film-refining process improves both of these known methods and creates conditions which will make possible entirely new methods.

The available molten iron, except when produced in charcoal blast furnaces, will be too high in sulphur and phosphorus. It is common practice to reduce the sulphur content of molten iron with soda ash or caustic soda. This is effected by introducing the alkalies, either in the ladle or into the running stream at the blast furnace or cupola. This method which removes 60 to 75 per cent of the sulphur contained in the molten iron depends on the rapid and intimate contact between the molten iron and alkali slag. If the molten iron and the alkali slag is kept in intimate contact over an extended and controlled surface, the removal of the sulphur will be close to 100 per cent. Merle refiners are designed to deliver molten iron desulphurized and free of alkali slag.

Conversion of the available desulphurized molten iron into steel can be accomplished in one or more operations depending on the refining method selected and composition of the steel to be produced. Refining installations will include the following equipments:

1. A film-converter ½ to 2 tons per minute capacity.
   A turbocompressor.
2. Film-converter, turbocompressor.
   Film-refiner and a small slag melting furnace to melt a lime slag and dephosphorize the steel produced by the converter.
3. Two film-refiners in step.
   One melting furnace for oxidizing slag (iron ore, limestone).
   One melting furnace for lime slag (iron ore, fluorspar and lime).

An installation No. 1 will transform molten iron into steel with an air blast same as at present effected in regular bessemer or small tropenas side-blow converters. Converter steel is not accepted under many specifications, being claimed that it contains more oxygen, hydrogen, nitrogen and entangled oxides than steel made by other methods. However, this is the simplest and fastest steelmaking method.

Construction and operation of present converters are well known. The Merle film-converters also use a blast of air, but their construction and operation are entirely new and different.

A film-converter is a film refiner set in a slightly inclined position close to horizontal, same as a centrifugal pipe casting machine. It will not deliver a batch charge of steel after 12 to 20 minutes same as other converters, but will produce steel continuously at the rate for which the machine has been built. This rate may be from ½-ton to 2 tons per minute and the machine will produce as many tons as may be required or as long as it is operated. In operation a continuous stream of molten iron—at the rate indicated above—is poured into the refractory lining of the revolving cylinder which continuously transforms this molten iron into a cylindrical thin film moving towards the delivery end at a controlled rate of motion or circulation. The extended surface of this molten iron film, is several hundred times greater than in side-blow converters and while circulating, is subjected to a number of air nozzles impinging upon it the necessary amount of air to insure complete oxidation of all the silicon, manganese and carbon contained.

By J. M. MERLE
*Metallurgical Engineer*
Chicago

***The first installment of Mr. Merle's article, which was presented in last week's issue, described the refining machine in detail and cited the operating conditions and technical advantages of the process. In this final installment the author discusses the industrial applications of his process including the slag refining procedure.***

*The Editors*

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# *Get More Production*

## SAVE VALUABLE FLOOR SPACE

# TAYLOR-WILSON Cutting-Off Machine

Taylor-Wilson Machines are finding many new uses in the war production program. For example, they are saving hundreds of productive hours in the cutting of Bomb Blanks, doing the work faster, more economically and with unerring accuracy. Like results are being achieved in the cutting of Roller Bearing Blanks, Coupling Stock, etc.

The machines will cut tubing made of all grades of steel including N-80 seamless.

Made in six sizes. Each machine has a wide range making unnecessary the installation of a battery of machines—and conserving floor space.

Cutting-Off Tools are hydraulically driven permitting unlimited flexibility in range of speed of cutting.

All gears and bearings are lubricated by motor driven circulating system which strains the oil before circulating.

Only one man is required to operate the machine.

Rugged cast iron frame, and perfectly adjusted heavy-duty parts, provide extra sturdiness and assure vibrationless operation.

*Write for Descriptive Literature*

# TAYLOR-WILSON MFG CO.

## 15 Thomson Ave., McKees Rocks, Pa.

PITTSBURGH DISTRICT

The whole cycle of transformation of iron to steel is produced during the film circulation the refractory cylinder and steel comes out at the delivery end, where it is received into a ladle. This steel can be run into a film refiner, in film contact with a lime slag for dephosphorization, which will deliver it to the receiving ladle. Additions of molten iron, or ferroalloys to adjust the steel composition, as well as deoxidizers, will be made in the ladle, as usual.

The centrifugal action used, not only creates the extended surface necessary for quick oxidation, but it has many other beneficial effects: The acid slag produced (silica and manganese oxide) never comes in contact with the refractory lining being kept separated from it by the layer of molten steel. The large gas evolution due to carbon oxidation is greatly facilitated. Nitrogen and hydrogen do not penetrate the molten metal film and have no chance to remain occluded. The oxides are immediately separated, as soon as formed and kept centrifugally separated from the steel, which for all these reasons, comes out unusually clean. Besides the steel is very hot, as the heat produced by the chemical reactions is fully imparted to it instead of being dissipated in great part in the atmosphere and no metal is thrown or blown out of the machine.

**Requires Ordinary Compressors**

No high air pressure is required for the functional use of creating a surface of contact and ordinary turbocompressors giving 2 pounds pressure can be used. The control of the whole operation does not involve any delicate checking of a varying flame color, but only pouring a steady stream of molten iron and keeping a uniform air pressure. A basic lining can be used for high-phosphorus iron or an acid lining for bessemer iron. This new method reduces or removes the factors which have caused widespread objection and prejudices against bessemer or blown steel.

With a simple installation for use of high-phosphorus iron, iron foundries existing in large number and well scattered through the country, could become steel producers of steel castings, which are in great demand, or even of rolling mill products: Ingots, slabs, bars, billets, etc., which could be rolled by the numerous nonintegrated mills.

Still another installation uses the now preferred method of refining molten iron with oxidizing slags. This new procedure can be used equally well for large tonnage production as for laboratory research. It can also be used for small scale production of high purity metals or alloys and equipment can be built to fit these various requirements, also to teach practical metallurgy in colleges.

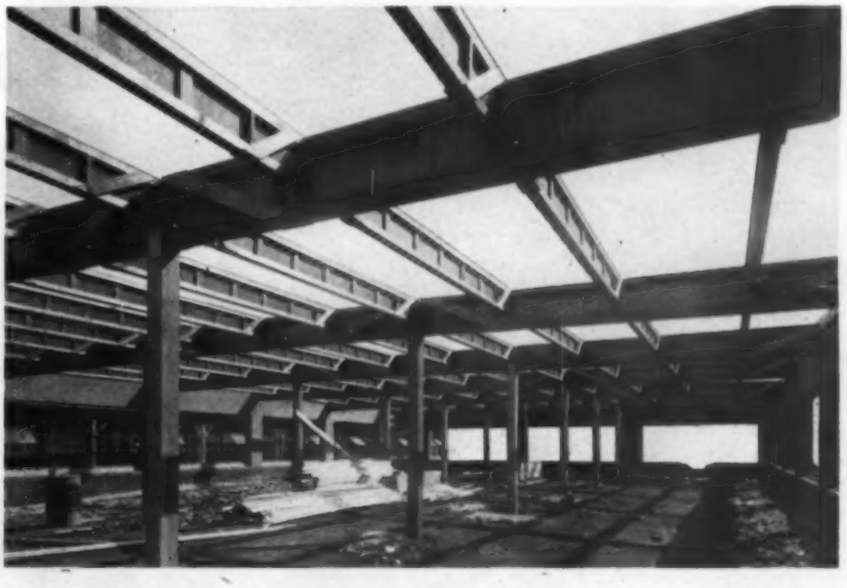
The slag refining procedure necessitates the use of more equipment than refining with a blast of air. In most cases, slag melting furnaces for the production of two different slags have to be provided. This slag melting equipment will be designed to supply the required amount of both molten slags at the right temperature and at the right time, in co-ordination with the available supply of molten iron or steel and the rate of steel production. The amount of molten slags required may be small, such as for the production of a few tons of steel to be cast into sand molds or it may be large, such as for a large steel mill and the slag melting furnaces will be designed to fit the schedules of production.

The slags used will consist mainly of two kinds: Oxidizing slag composed of iron ore or scale and limestone melted together in the amount and proportion corresponding to the analysis of the molten iron or remelted steel to be refined. Second: Lime slag composed mainly of lime with a percentage of iron ore and some fluorspar for fluidity for dephosphorization and desulphurization of the refined steel. These slags can be melted in various types of furnaces, such as open-hearth, rotary and arc furnaces. The fuels used can be: Oil, powdered coal or charcoal, or gas. The amount of slag required will vary with the amount of metalloids to be oxidized contained in the molten metal and will be from 10 to 30 per cent of the weight of the molten metal. It will be apparent that it is easier and cheaper to prepare and melt a slag of exact composition in a small independent furnace and to obtain it at the desired temperature of 2600 and 3000 degrees Fahr., than in large batch furnaces also containing molten metal and in which the proper reaction temperature will have to be maintained for several hours. On this account alone, the film-refining process makes available a saving of 75 to 90 per cent of the heat or electric energy now spent during refining operations in open-hearth and electric furnaces.

In present practice, it takes a long time to complete the slag oxidizing reactions, in open-hearth and electric furnaces and to permit the newly formed oxides to rise to the surface of the bath to obtain reasonably clean steel. To cut this time factor, steel scrap amounting to about 50 per cent of the weight generally is added to dilute the proportion of metalloids contained. On account of the steel scrap scarcity, this amount will have to be reduced to 40 per cent and eventually to 25 per cent or less as only mill scrap may be available. However, under the conditions of operation, the metal bath is agitated most of the time,

(*Please turn to Page* 109)

## "PINCH HITTER" FOR STEEL



**CONSUMPTION of steel for military purposes led to development by Timbeam Inc., Detroit, of this wood structural framing shown here for expanding industrial plants. In this construction, beams comprise a plywood web with vertical stiffeners and flanges glued and doweled in place. Their ends are reinforced with diagonal ties from bottom to top flange, and all splices and connections are made with split ring connectors**

# SPEEDING WAR PRODUCTION

*. . . . by encouraging employes to improve their own operations*

AN ASSEMBLY fixture, designed in his spare time by Albert Wender, an employe, and manufactured out of scrap materials, has raised the output of siphon tubes for Army tank fire extinguishers from 100 to 400 parts per 8-hour shift at the New Jersey plants of Walter Kidde & Co. This simple yet highly effective device is shown in Fig. 3.

John Space, also a Kidde employe, has worked out another scrap steel device that increased the output of valves for gas-type airplane fire extinguishers by 25 per cent. See Fig. 4. Gains of 71 and 100 per cent in two other typical assembly operations have resulted from this showing of employe inventiveness. Let us examine in detail the program that so effectively interests the employe in improving his operations.

These tangible gains are part of the

*Fig. 1. (Immediate left)—Old method of assembling a part for a carbon-dioxide fire extinguisher involved all handwork. Output was 84 pieces per hour*

*Fig. 2. (Below)—New method of assembly worked out by an employe uses a special jig made from scrap metal to hold the part. Aided by more efficient positioning of parts going into the assembly and by a motor-driven tool, the output was incerased to 143 pieces per hour*

*Fig. 3. (Upper view)—Assembly of siphon tubes for carbon dioxide army tank fire extinguishers was increased 400 per cent by the device shown mounted in the vise in the foreground. Albert Wender designed the fixture in his spare time, using scrap steel. Operator holds old hand fixture in background*

*Fig. 4. (Lower view)—Made from scrap iron pipe, this simple fixture increased the output of valves by 25 per cent. Efficient arrangement of parts for two-handed assembly is another development originated by this employe to improve materials handling*

result of the work simplification program that is playing a major part in the new Kidde war production drive. This program, which was inaugurated some months ago, is itself the invention of an employe—B. P. Corcoran—who until recently was a worker on the assembly line. Night school courses acquainted Mr. Corcoran with the principles of motion study, and his years of experience as a worker gave him the idea of applying these principles to the men themselves.

The work simplification plan was put into effect after preliminary tests showed that a typical assembly on fire extinguishers could be done 64 per cent faster with less fatigue when useless motions were eliminated. The new program follows the same general lines as the plan recently proposed by the War Production Board. Essential difference is that under the work simplification program of the WPB, leaders and key workers will be given ten hours of intensive training in a period of five days at some point away from their plants. Under the arrangement worked out by Kidde, the company rather than a government agency offers the training, thus permitting a far more intensive and specific course over an eight-week period without disrupting production through the absence of key men.

The new Kidde work-simplification training program is the result of several months' study on the part of the management as to how it could best increase efficiency on "little jobs." Previous training programs had been worked out for the time-study engineers and designers, but while this took care of the major problems of plant layout and equipment design, there were still too many orders being held up because of some small job on the bench.

This work simplification plan is based on the fact that the man on the job often knows more about improving that particular job than a highly trained engineer who may not be so intimately acquainted with it. The basic problem is how to get the worker to bring out his ideas. The two major difficulties involved are expression and shop psychology.

The most widely used method for soliciting employe ideas is the suggestion box—a method which has incidentally been used with great success in the Kidde plants, and which is still being employed in conjunction with the work simplification plan. But the suggestion box presents two obstacles: Ideas often get sidetracked and so amended that they are not recognizable. Employes often lack sufficient knowledge of engineering terms to express themselves explicitly.

*Under the Kidde work simplification plan, both obstacles are overcome by letting each man work out his own ideas, presenting the end result as an accomplished fact.* The starting point is the foreman or group leader. Regular classes are held for these men in which they are acquainted with the principles of motion study, expressed in simple shop language rather than engineering terms. In these classes they are given assistance in working out their own ideas, preparation that will enable them to help the men under them.

Under the new program each foreman and group leader is taught:

—To find and eliminate unnecessary

*Fig. 5—Practical training program results in making each employe his own efficiency expert. Here a typical group of workers are studying an assembly program. Employes are urged to use facilities of the machine shop to work out their own ideas. Some 100 men attending these classes have already developed scores of devices for increasing war output*

operations or motions.

—To create and use simple fixtures, devices and gadgets.

—To analyze the value of every group of motions, and to retain only those which are fundamentally necessary.

—To recognize and reduce the fatigue parts of all operations.

—To sell himself a new idea or improvement first.

—To sell the worker the new idea and see that it is performed exactly right.

—To feel that every job can be improved.

—To think of every new idea as of possible great importance.

—To look for the good in new ideas without being too prone to find fault.

—To realize that improvements don't just happen, but must be made.

—To use what is at hand to the best advantage before making changes.

—To consider himself an "on-the-job" engineer and approach each problem step by step, recording every detail until he arrives at a better way.

In addition, a machine shop, completely equipped with hand and power tools, has been provided for the employes so they can make up their own devices. Employes can use this shop either on their own or on company time, and a skilled machinist is always present to aid the worker with an idea.

*According to Mr. Corcoran, 90 per cent of the job in selling a new simplification idea to the men is psychological.* Under the Kidde setup, this is accomplished by asking that the foreman or group leader with an idea do his own selling job. For example, a foreman can explain to his crew that a new method is designed to make the job simpler and easier for them, without bringing up the hated words "speed-up" or "efficiency." A company executive or efficiency engineer would have a far less receptive audience.

An important part in the development of the new program has been played by the Kidde workers who, through the medium of their labor-management group, have devoted a great deal of time and thought to ways and means by which methods can be improved and production increased. Among the proposals originating in this manner and incorporated in the new program is one whereby *workers as well as foremen are encouraged to produce new work simplification ideas.* The means is extremely simple—merely the giving of credit to an employe who makes a suggestion by posting his name conspicuously on a bulletin board in the plant.

Not only is each man given full credit for every suggestion he makes, under the theory that a stolen idea is the worst form of sabotage, but in addition the individual worker is encouraged to give credit to those who have helped him develop his idea. This encourages cooperation, and it is surprising how many of the plans turned in, both through the suggestion boxes and work simplification classes, give credit to other workers for their assistance.

One place where the new job simplification program is expected to take on particular significance is in facilitating the training of women workers when they are called in to replace men more urgently needed on the fighting fronts. According to company officials, this reason alone might influence other firms to institute similar plans.

Work simplification is only one phase of the war production drive in this plant. A labor-management committee, formed along the lines suggested by the WPB, is extremely active. In addition to maintaining the suggestion boxes, it has setup production boards, literature boxes, and frequently displayed posters and reprints.

Small production boards, with movable arrows showing the relative output of each shift, are setup in each department. A huge illuminated board representing the entire plant is hung from the ceiling in each factory. This board uses airplanes and bombs for symbols in the production race, and was tested in advance to make sure the workers understood its message. In addition to showing the relative standing of each shift, these boards show last month's standings and spoilage figures.

The literature boxes are set up near the employe entrances and contain a wide variety of material varying from reprints of speeches by Donald Nelson to special booklets prepared by the company and by the union.

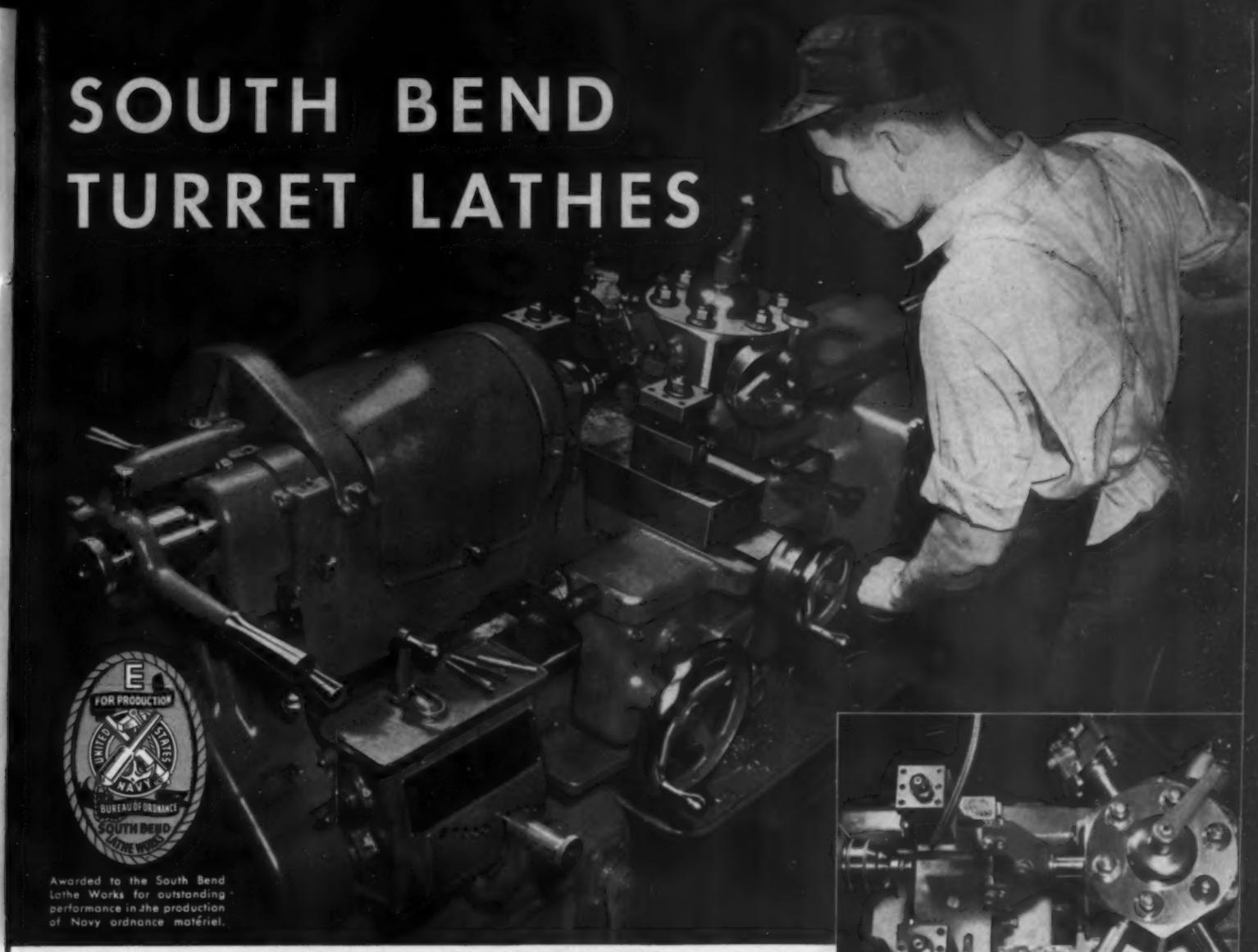
Other bulletin boards placed in prominent places carry telegrams from the War Production Board—stories of products in actual use, etc. These have had a surprising effect. One man with a brother in the tank corps was turning out cylinders for tanks. He started saying "I hope that gets another Nazi—" every time he finished a cylinder. This spirit is further fanned by posters reading "Remember You Are Making Life Saving Equipment" and reprints of cartoons showing labor management unity, which are hung in prominent places.

## Lathe Center Lubricant Prevents Scoring; Wear

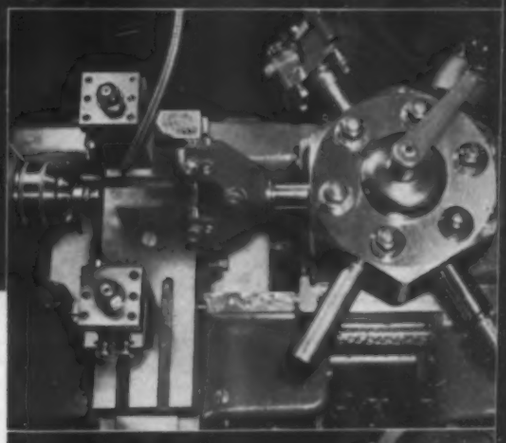
A new lubricant for the dead centers of lathes developed recently by Joseph Dixon Crucible Co., Jersey City, N. J., is reported to withstand extremely high pressures and temperatures developed in this area of the lathe. The product is a combination of pure flake lubricating graphite and other specially formulated ingredients.

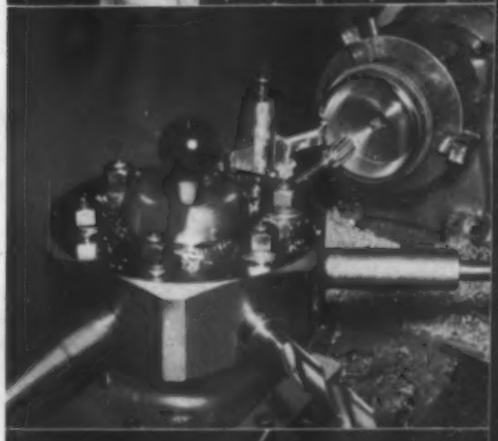
Tests show the lubricant effectively controls overheating and protects dead centers against scoring and softening, reducing wear of the dead center and also reducing spoilage of work. It also has many uses as an anti-seize compound where a lubricant of extreme film strength is required.

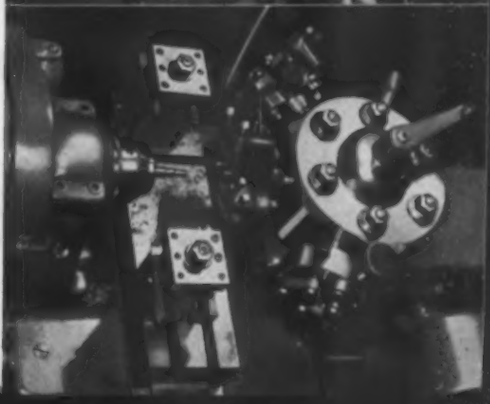
# SOUTH BEND TURRET LATHES



Awarded to the South Bend Lathe Works for outstanding performance in the production of Navy ordnance matériel.







## Productive Versatility

South Bend Turret Lathes have the kind of versatility that speeds production on many classes of work. A wide range of spindle speeds permits maximum cutting tool efficiency. Rapid change from high speeds to low speeds saves time on thread cutting and reaming operations. A quick change gear box provides 48 changes of power feeds for the universal carriage and the turret. The universal carriage has 48 precision thread cutting feeds driven through a lead screw and half-nuts.

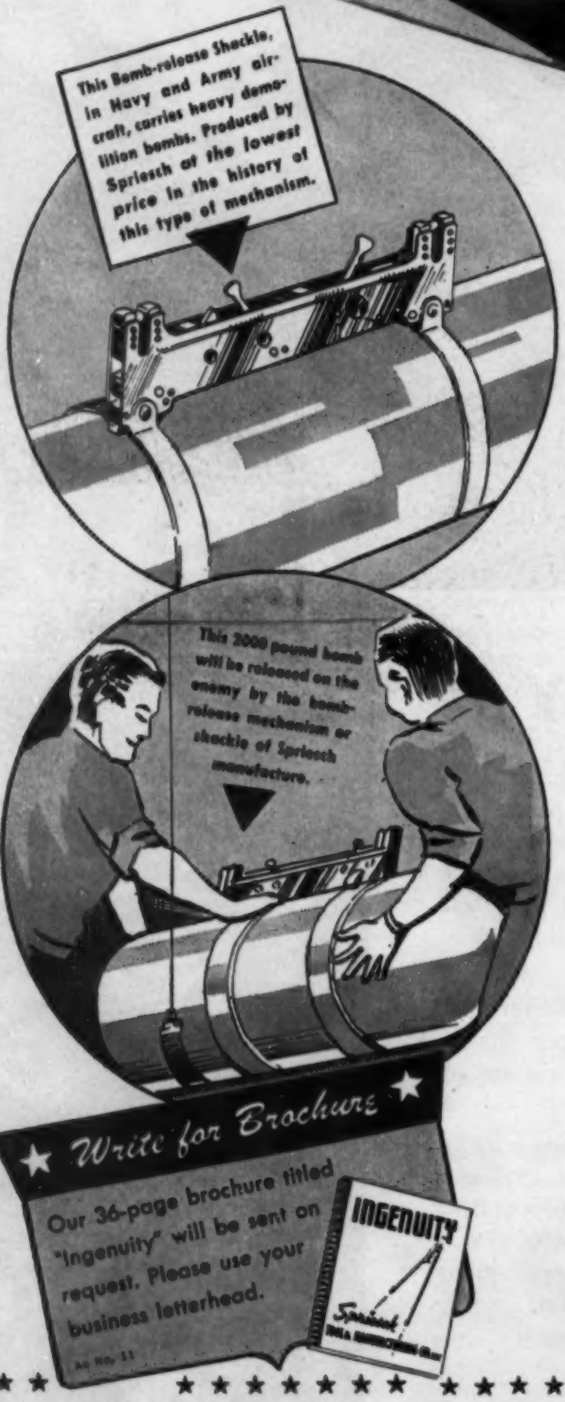
Standard extras include compound cross slide, four-way turret tool block, micrometer carriage stop, thread indicator dial and taper attachment. These attachments simplify tooling the lathe for many classes of work, and make it especially adaptable to second operation jobs.

The South Bend No. 2-H Turret Lathe has a chucking capacity of 16¼″ swing over the bed and saddle wings, a spindle bore of 1⅜″ and a collet capacity of 1″ for round stock. Twelve spindle speeds (16 to 880 r. p. m.) are provided. The effective feed of the turret slide is 6⅛″ and the distance from spindle nose to turret is 30½″. Complete specifications are contained in Bulletin 67-T, which will be sent upon request.

**SOUTH BEND LATHE WORKS**

**South Bend, Indiana** *Lathe Builders For 36 Years*

# Is Your Future Wrapped Up In Our *Bomb Shackles?*




★ No, that is not a far-fetched question. It is possible that your future may be wrapped up in our aircraft armament, Bomb-release Shackles.

★ Let's look at it this way. Today we are producing parts for America's war machine. Bomb Shackles, made to exact specifications, being produced 24 hours a day, 7 days a week. This is war production. In addition our long experience includes serving the U. S. Army since 1928.

★ Out of all this has developed the Spriesch modern war production ability. A production method with the lowest percent of rejections!

★ All right, where is your future in this? Simply turn this recognition by the U. S. Army and Navy of Spriesch ability to originate and produce to your problems.

★ Make sure of your future position in competitive industry tomorrow, by planning now to use Spriesch modern war production ability in peace time.

Joseph J. Cheney, President.

★ Spriesch

*Established 1923*

**TOOL & MANUFACTURING CO., Inc.**

**10 HOWARD STREET BUFFALO, NEW YORK**

★ ★ ★ 

## Flash Welding

(*Concluded from Page 82*)

ing size may be chosen and the tentative curve then used to determine the transformer tap setting.

Upon testing, it may be found that the weld is not strong enough, but that by increasing the current a stronger weld may be made. This new setting would not be compatible with the tentative curve; but the latter may be changed somewhat by properly balancing the tap setting for the previous points with compensating variations in the related mechanical settings. The latter in this case would be the flashing time and the time interval between current cut-off and start of the upset. By a painstaking application of this process it has been found possible to obtain a set of curves of broad applicability.

The relation of the time of current cut-off to the time of upsetting (forging) was found to be extremely important. Since this relation cannot be found (to any degree of accuracy) by visual observation while the settings are being adjusted, an oscillograph was connected to the flash welder, see Fig. 10. Traces of current, voltage, cylinder pressure and platen movement were recorded for various welder settings, see Fig. 4B.

From these oscillograms a family of curves, Fig. 3, was plotted showing the cycles time interval between current cut-off and start of the upset (forging action) versus the current cut-off setting, for various flashing times. Fig. 3 was plotted for a fixed upset valve setting of 3, which was used throughout the tests. Should this valve setting be altered from position 3, the curves would be shifted by a corresponding amount.

The calibration curves given in Fig. 3 can be used in setting the machine for any desired time interval between current cut-off and upset; and the proper values to use for this time interval have been found to be a function of tubing cross-sectional area, as shown in Fig. 5. The procedure is to fix the time interval by Fig. 5, select the proper flashing time from Fig. 1 (as a function of wall thickness) and then use Fig. 3 to determine the corresponding current cut-off setting.

For example, if it is desired to weld 0.065 x 1½-inch outside diameter tubing (area of which is 0.295 square inches), reference to Fig. 5 shows that the current cut-off should occur 8½ cycles after upset. From Fig. 1, the flashing time for tubing of 0.065-inch wall thickness should be 3¾ seconds. Then from Fig. 3, for this flashing time of 3¾ seconds, and for cut-off to occur 8½ cycles after upset, the current cut-off adjustment should be set at 3½ (for an upset valve setting of 3).

It was found desirable *to bevel or chamfer the end of one of the tubes at the point of joining before welding*. This encourages a more consistent flashing condition and eliminates any possibility of faulty welds due to a burning condition if the initial flash is too abrupt.

It was also determined that it is extremely important that *the dies be in perfect alignment*. This insures a uniform heating around the tubing wall at the section to be joined and prevents one tube wall from "crawling" over the other. This, of course, becomes more and more important as the wall thickness is decreased. The dies should also fit the tubing very closely and the gap between the mating die halves should be held to a minimum.

Having made optimum adjustments as described in the foregoing paragraphs, a series of consistency tests was run, the results of which are summarized in Table I.

**Discussion of Results:** It is felt that the curves of machine settings, etc., as delevoped, are valid, since welds on various sizes of tubing, using the data from the curves, have exhibited satisfactory physical characteristics. It is also noted that definite trends have been established which will give the machine operator an understanding of the relation of the settings necessary to weld any size tubing and also assist him in becoming familiar with its operation as well as its possibilities and limitations. This is very important as the degree of confidence and understanding an operator has in the machine will be reflected in the quality of his work.

Such a correlation of points is also a definite aid to the designer since it will enable him to find how long a tubing or end fitting must be made in order to allow for the burn-off that takes place during welding. This set of curves will also satisfy all tube size combinations (within the range of the machine) of any design requirement.

If random machine settings were made without regard to correlation between tube sizes, both the designer and the operator would be at a loss to predict the conditions which would result for a new tubing size.

Although it has been observed that most of the machine variables are confined to a rather narrow range for any specific tubing size for a group of related settings, it is recognized that they are not critical enough to present any serious problem for production.

**Weld vs. Tubing Failure:** At the outset of this test program, it was supposed that if welds were really good they could be made to give consistent failures in the tubing, with no failures in the weld itself. It was assumed that if welds were of good quality, failures would always occur in the tubing; if welds were of poor quality, the weld itself would fail, and at load values far below the strength of the tubing. However, while welds made under unfavorable conditions are weak and always fail at low load values in the weld itself, it has been determined that welds made with the proper machine settings and control will withstand loads up to the ultimate strength of the tubing, and at this point failure may occur either in the tubing *or* in the weld.

One reason for tubing failures (see Table I) is that the cross-sectional area at the weld is greater than the cross-sectional area in the tubing, causing a higher unit stress in the tubing. As previously mentioned, the flash is left intact in the inside of the tubing and ground off to within 1/64-inch of the tubing surface on the outside. Under such conditions, a weld failure does not mean that the weld was of poor quality, as can be seen in Table I.

There are cases noted of the *lowest* weld failure occurring at a higher value than the *lowest* tubing failure. In cases where the lowest failure occurs in the weld, the lowest tubing failure is very little above the failing load of the weld.

**TABLE I—Consistency Tests on Flash Welded X-4130 Tubing**

Welded in the "as-received" normalized condition using 100 kva type B-7-30° hydraulically operated flash welder—tested in "as-welded" condition.*

| Tube Size, Ind. | Specimens Tested | Ultimate Tensile Strength Unit Stress at Failure, Psi. Average | Maximum | Minimum | No. of Weld Failure | Lowest Weld Failure, Psi.† | Lowest Tube Failure, Psi.† |
|---|---|---|---|---|---|---|---|
| 0.035 x ⅜ | 5 | 115,000 | 127,900 | 96 300 | None | . . . | 96,300 |
| 0.035 x ½ | 25 | 127,900 | 134,000 | 122 600 | 1 | 126,000 | 122 600 |
| 0.049 x 1 | 25 | 113,900 | 117,000 | 109,500 | 2 | 110,400 | 109,500 |
| 0.049 x 1½ | 25 | 120,000 | 123,000 | 118,000 | 2 | 118,500 | 118,000 |
| 0.065 x 1¼ | 25 | 111,000 | 120,000 | 105,000 | None | . . . | 105,000 |
| 0.065 x 1½ | 25 | 109,500 | 111,000 | 104,000 | 3 | 104,000 | 109,000 |
| 0.083 x 1⅜ | 25 | 116,000 | 136,000 | 101,000 | 6 | 101,000 | 111,000 |
| 0.083 x 2¼ | 25 | 113,000 | 121,000 | 99,500 | 10 | 99,500 | 109,000 |
| 0.156 x ¾ | 25 | 110,900 | 112,700 | 110,000 | None | . . . . . | 110,000 |

*Outside flash ground off to within $\frac{1}{64}$-inch of surface, inside flash intact.

†Minimum guaranteed ultimate tensile strength for normalized X-4130 tubing is 95,000 psi.

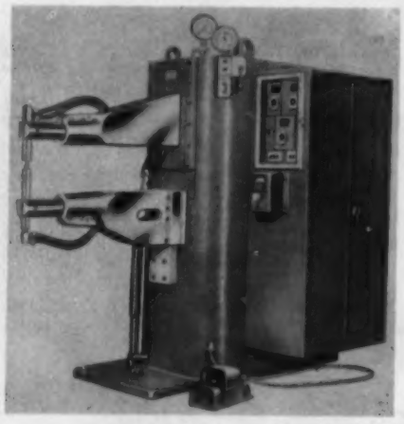
# INDUSTRIAL EQUIPMENT

## Resistance Welder

Sciaky Bros., 4915 West Sixty-seventh street, Chicago, announces a new type PMCR. 2S16 rocker-arm resistance welder for spotwelding aluminum and its alloys. It embodies features such as stored energy with preheating and variable pressure with recompression.

Other advantages include adjustable electrode tips which may be set at any angle without impairing their proper welding position; all gages and dials are visible to the operator and are set on the frame of the machine.

The welding process incorporated in the welder compensates for the natural expansion that takes place when the metal is in the molten state during the welding process. The unit preheats the metal tending to overcome high thermo



conductivity, thus slowing down the cooling process and provides an added protection of a "forging" pressure.

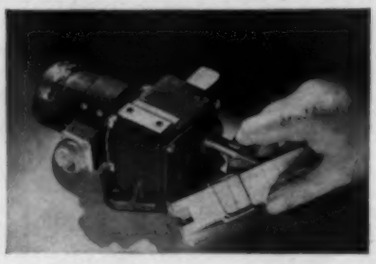
The machine supplies a total pressure of 3000 pounds between the electrode tips from a supply line of 90 pounds using a normal throat depth of 34 inches. It has a welding capacity of 0.080-inch plus 0.080-inch, 24 St Alclad. Its welding stroke is ½-inch and retraction stroke 3½ inches. A special face plate at 45 degrees can be incorporated with the vertical face plate for special work.

## "Power Package"

General Electric Co., Schenectady, N. Y., is offering a new driving mechanism—the "power package"—for use in aircraft subassemblies. Its design depends upon the application for which it is built. According to GE designs are available for applications including bomb-door operation, landing-gear and wing-flap operation, and operation of control and protective devices.

The "power package" combines in one compact unit as many items as a motor, brake, clutch, and limit switch as well as indicators, gears, and whatever else is required to do a specific job. They are designed for 24-hour service, and can be obtained in ratings from about 1/100 to 3 horsepower.

Each element in the "power package"

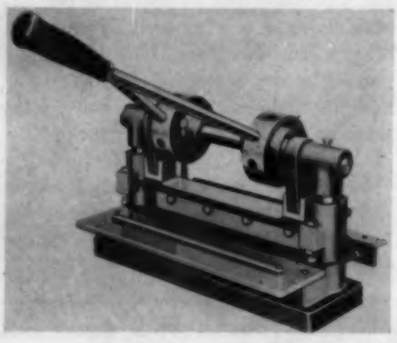


is reduced to its simplest terms to save weight and space. A new planetary gear system permits the use of a magnetic brake in the "package" for some applications. The brake is of the quick-acting friction type and stops the motor quickly to prevent overtravel and consequent jamming of the driven plane assembly. When the power is off, driven equipment is locked in place by the brake, to eliminate creeping of such subassemblies as landing gear.

## Shear for Light Metals

O'Neil-Irwin Mfg. Co., Minneapolis, is offering a new No. 2 Di-Acro shear suitable for precision work on light and medium weight metals and materials that cannot otherwise be rapidly worked to accurate tolerances with a hand-operated "scissors" shear, or with a heavy foot operated floor-type shear. It is reported to provide an accuracy guaranteed to tolerance of 0.001 inch in all duplicated work.

Maximum shearing width of the unit is



9 inches, its capacity for this full width being 22 gage steel. Both shear blades are of heavy tool steel having spring-charged action automatically returning shear blade for next operation. Blades also are reversible offering double service with resharpening.

The shear can be quickly arranged for shearing, squaring, slitting, stripping or notching to extremely close tolerances. All ductile and pliable metals and materials can be accurately worked, including spring-tempered metals, fabrics, plastics, leathers, rubber and the very lightest of tissues. Power-driven shears also can be furnished as a complete unit —with shear, countershaft and motor mounted on a rigid floor-type stand.

## New Brushes

Osborn Mfg. Co., Cleveland, has introduced brushes that look like disks with two square corners and rotate like a spinning coin for use in removing rust, scale, rubber, burrs, sharp corners, dirt and chips from metal holes, cavities and recesses. Called Sibot brushes, they will clean both the bottoms and side walls in the cavities of various machined,

stamped, cast and forged parts in one operation.

The brushes may be used by hand, automatically or semi-automatically. They may be inserted into the chuck of an ordinary drill press, for example. Another advantage of these brushes is the uniformity of results. The brushes are constructed in such a way that makes it impossible to injure the work if proper conditions exist. The reason for this is no metal parts extend beyond the working diameter of the wire units.

## Carrier Frames

Lyon Metal Products Inc., 3119 Clark street, Aurora, Ill., recently introduced new steel carrier frames featuring wood liners (inserts) for storing and protecting finely machined and highly finished parts and tools. It is a rectangular container without bottom with side walls formed into a channel shape to strengthen and hold the inserts in position.

The frames are fitted at each corner with a heavy steel lug to permit stacking. The lugs permit several frames to be

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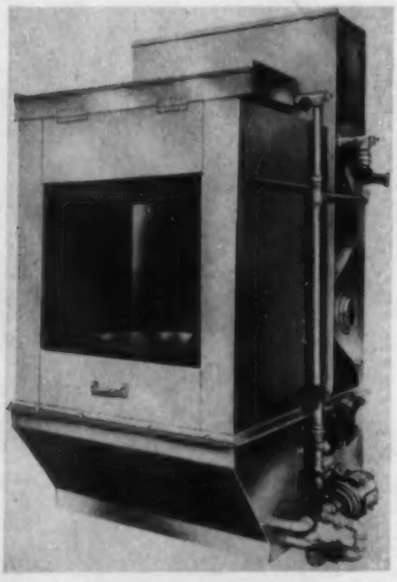
# NORTHWEST

fastened or stacked together to form one rigid unit. Frames are being offered in two sizes—30 x 20 x 5¾ inches and 30 x 30 x 3¾ inches.

## Paint Spray Booth

Aqua-Restor Division, Mayer Mfg. Corp., 45 Division place, Brooklyn, N. Y., is offering a new single-compartment Aqua-Restor paint spray booth, featuring rear and side water-impingement walls. Its "super-turbulent" water-washed walls, through continuous and pressured flow is reported to provide unusual efficiency in spraying operations of all sizes and types.

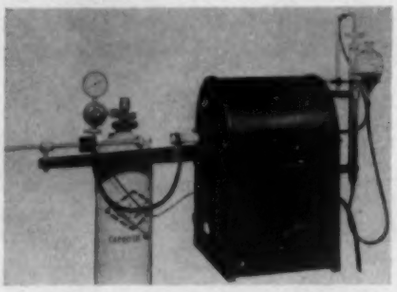
Employe health protection also is assured, and fire hazards are reduced to a negligible minimum. The makers claim the absence of spray nozzles eliminate the possibility of clogging; little servicing, due to complete elimination of moving parts. Used water may be drained directly, or pumping can be arranged for distant disposal. It is offered in single or multiple units.



## Gas Determinator

Harry W. Dietert Co., Detroit, is offering a new gas determinator, for determining gas content of cores and molding sands. It consists primarily of a Varitemp combustion furnace equipped with a gas measuring burette on the furnace, a combustion tube, a magnetic boat push and a gas pressure regulator. All of these parts form an integral unit of the combustion furnace.

Test procedure is to place 3 grams of core or dried molding sand in the combustion boat. Then boat is placed in the cold end of combustion tube, closing the end of combustion tube with the magnetic boat pusher assembly. The boat, with the sample, is then pushed into the hot zone of the combustion zone. The sample is usually burned in a carbon dioxide atmosphere or it may be burned in any atmosphere chosen. The rate of gas evolution and volume of gas formed is read from the burette.

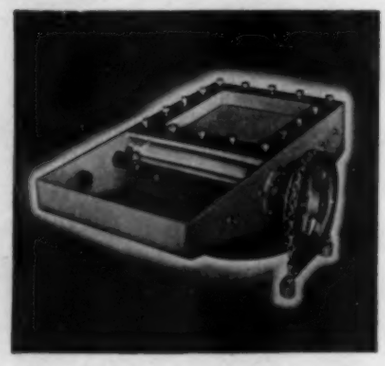


Unit may be used to determine the gas content of many materials, according to the company. It is pointed out that the unit also may be used to determine the actual coal content of molding sand

## Coal Valves

Beaumont Birch Co., Philadelphia, announces a new series of coal valves in sizes ranging from 14 to 20-inch openings for installation in chutes feeding coal to pulverizers or stokers.

Corrosion-resistant, these cast iron valves have a shaft and pinion assembly with dust-tight ball bearing rollers which support the gate. Latter is U-shaped to prevent coal from clogging racks and pinions. Valves can be operated easily even when the discharge chute is plugged. They are equipped with 12-inch rag wheel, chain guard and 10 feet of chain. They also can be furnished with a smooth hand wheel.



## Flow Recorders

Cochrane Corp., Seventeenth and Allegheny avenue, Philadelphia, announces a new 2-pen electric flow meter (actually two complete flow meter receivers mounted within one double depth case) for use where panel space is at a premium, or where it is desired to have two related flow records on the same chart for ready comparison.

Both receiver mechanisms of the unit can be swung out and operated in the swung-out position. The connection between the rear receiving mechanism and its pen arm is detachable and is arranged with a self-aligning V-notch junction.

Where two related measurements are involved, the operator has often sufficient guidance by observing the coincidence (or lack of it) of the two pens. However, this does require that he note which pen is which. For cases where continual reference must be made to this relationship of the two records, a ratio indicating pointer can be incorporated.

The red target moves to right or left from the center point on the scale and thus shows at a glance whether there is an excess or deficiency of one of the quantities with respect to the other. Integrating features can be furnished on both mechanisms but reading of rear mechanism integrator requires opening case and swinging front mechanism forward.

## Magnifier

Stanley Electric Tool Division, Stanley Works, New Britain, Conn., is offering a new Flud-lite magnifier qualified with fluorescent daylight lamps for use in inspection work. With its powers of magnification and shadowless lighting, the unit is said to make possible the finding of cracks and scratches, inspection of machinists' tools such as reamers, gages, punches and dies, etc.

Fluorescent lamp of the unit is focused to distribute natural light over the object without creating shadows. A 5-inch lens with focal length of 13 inches, provides

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the magnified vision. The lens is supported by a frame and arms of die castings, ribbed for strength.

Base and frame swivel joints and friction-arm joints permit movement of lens

to any desired position without moving base. Unit is offered in two models—No. 701 for bench work, used on conveyor belts or on machines and No. 701H for portable inspection anywhere in the plant.

## Portable Pipe Bender

Tal's Prestal Bender Inc., Milwaukee, announces a portable pipe bender which produces smooth, wrinkless bends in one operation up to almost 180 degrees. It features fast and easy operation, bending all iron and steel pipe as well as solid bars of mild steel from ⅜ to 2 inches.

Hydraulic pumping action produces the bending pressure. The pipe holder and the hydraulic cylinder are held together by a key, which eliminates the

use of threads. Several bending formers are available for the unit. These come in sizes ranging from ⅜ to 3 inches.

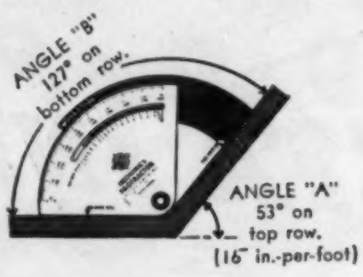
## Welding Electrode

Air Reduction Sales Co., New York, has introduced a new electrode specifically for all-position welding of mild steel alternating-current welding machines. It complies with all requirements of the American Welding Society classification E6011, American Bureau of Shipping group H1G and B1G for alternating current and other specifications qualifying it for use on war work.

The electrode is made in 1/8 and 5/32-inch diameters. Physical tests show the exceptionally satisfactory results. An outstanding characteristic of the electrode is that average operators have no difficulty in securing good fusion and complete penetration. The finished weld deposit is smooth and has a uniform surface contour.

## Protractor

Interstate Sales Co., 1123 Broadway, New York, announces a new Wolfe protractor for engineering mechanics etc., for use in measuring angles. It gives readings for outside angles, for




inside angles and inches per foot against degrees all in one setting.

The device consists of ⅛-inch thick phenal-resin laminated birch with the printing in red. It is not affected by grease or water.

## Annealing Machine

Morrison Engineering Corp., Cleveland, announces a new flame-type mouth and taper annealing machine for steel cartridge cases. It is reported to handle 50 caliber, 20, 37, 40, 57, 75, 105 millimeters and 3-inch and larger shell cases.

The machine is offered in two general types—one accommodating 50 caliber and 20 millimeter cartridge cases—the other for all larger sizes. The former is a straight line type while the latter is a modified dial type.

These machines are gas fired—of the continuous conveyor type. In the larger machine a conveyor chain carries rotating work spindles provided with fixtures suited to the size of the cartridge cases being annealed. When desired, spindles may be provided with different size fixtures to permit handling of cases of different, though not too widely divergent, sizes.

The cases rotate as they pass along in front of the flame. Burners are of the blast line type with adjustments to provide compensation for various gases and operating conditions. All controls, including proportional mixers and zero governors, are supplied to provide for a heating section and a holding or soaking section. Loading and unloading is continuous manual operation at one end of the machine. A sheet metal hood with vent connection encloses the operating mechanism. Hinged sides permit easy burner adjustment.

## Aircraft Switch

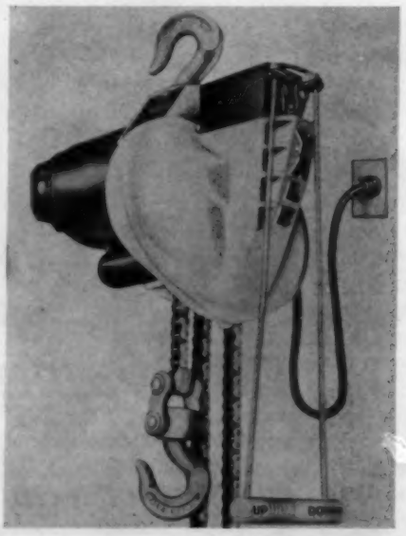
Industrial Control Division, General Electric Co., Schenectady, N. Y., announces a new switch specially designed for use in aircraft applications where space is limited and vibration conditions are severe. The switchette, as it is called, weighs 9 grams and meets Air Force requirements. It can be operated by lever, bellows or other actuating means by movement of a spring return button in the housing.

The contacts are arranged for single-pole normally open, single-pole normally closed, or single-pole dougle-throw operation. Each form is available with a contact air gap of 0.010, 0.020, or 0.030-inch. Overall dimensions are: Length, 1¾ inches; depth, 19/32-inch; and width, ½-inch.

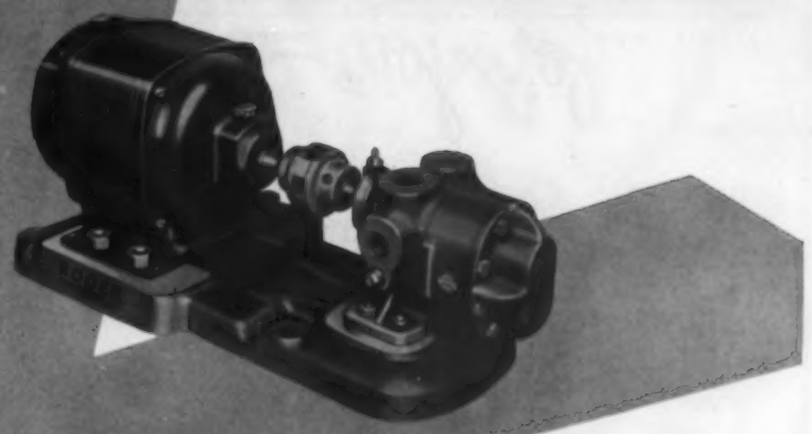
## Electric Hoist

Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia, announces a new Midget King electric hoist for lifting loads of ⅛, ¼, ½ and 1 ton capacities. It is being offered either as an alternating or direct-current unit.

No extra equipment, it is said, is needed for its operation—just a place to hang the hoist, an electric outlet to plug into, and it's ready for work. The hoist can be carried to any place in the plant with little effort and quickly put to work.



# ROPER *Rotary* PUMPS

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**THE STEEL MILLS OF AMERICA DEPEND UPON ROPER FOR UNFAILING SERVICE**

*Typical Steel Mill Installations*

Yes, Roper Pumps have won their spurs by on-the-job proof of dependability. Simplicity of design . . . only two moving parts . . . and sound construction do keep Ropers functioning longer at less upkeep cost. In practically all of the American steel mills you'll find Ropers handling the lubricating problems on reel strippers, sheet pilers, strip coiler and recoilers, feed rolls, hot bed and runout tables, leveler drives, gear reducers, pinion stand lubrication, general actuation of hydraulic rams.

From the hundreds of standard models available you can select what practically amounts to a custom-built pump for your particular job. You can rely on Roper!

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Roper Sales and Engineering Service reaches from coast to coast. All representatives have a thorough knowledge of engineering and a wealth of practical experience. Their services are promptly available to help you solve your pumping problems.

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with illustrations, cut-away views, drawings, dimension and pumping capacity tables and complete information on Roper Pumps.

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# We can make it for you—now!

CHARLES C. DOYLE
*President*

I have a story to tell to the executives of big companies who want to get more production, or some special type of production, ***FAST.*** This is no pipe dream. This is what we have done, and are doing today, for some of the important prime contractors. We have made aircraft parts, gun sight parts, tank parts, landing gear parts and subassemblies, just to name a few.

The WPB people call our operation a Vertical Pool. We were about the first successful large scale operation of this kind, starting long before Pearl Harbor. The members of our group are thoroughly experienced and dependable. They include many small shops where the owners are skilled operators working on their own machines, and some large plants that have specialized facilities available from time to time.

And please get this straight—The J. E. Doyle Company is not a middleman performing simply a selling function. We have a skilled production and engineering staff which provides the technical and supervisory know-how that most of these small shops lack. We do the "paper work" which they are not set up to do themselves. We see that they are provided with the necessary tools, jigs and fixtures. We take the responsibility for results.

We are not price cutters, but our costs are amazingly low. The work is allocated to the various shops according to their ability to do the job ***satisfactorily, immediately*** and at a ***reasonable profit*** to themselves.

The essence of our service is ***SPEED.*** Give us the job today and we'll start turning it out tomorrow. I mean that literally. That's the one thing that everyone says is most important and yet I find it the hardest to get across to prime contractors. They just can't understand how we can move so fast.

That's why we are taking this means of telling our story. Some of you big executives will have the imagination to see in this Smaller Business Pool operation the answer to your production bottlenecks. We'll gladly furnish references.

Phone, wire or write today.

Charles C. Doyle

VICTORY POOL No. 1 OPERATING THROUGH

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INCORPORATED 1921

**Engineers and Manufacturers of Infrared Ray Dryers**

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***Pool Facilities Include: Machining, Metal Fabrication, Welding and Brazing, Plating, Aluminum and Bronze Castings, Precision Instruments, Electrical Heating Elements, Complete Assemblies***


## Women Run This Shop

(*Continued from Page 69*)

who work standing, do not have to stretch or reach up because either the machines are low or platforms are provided.

Under the other rule, moving parts are covered either with steel plate or shatter-proof glass wherever possible. Besides this, each machine has its own overhead fluorescent light. The power for each comes from its own electric motor, started and stopped with the touch of a finger.

Found at Republic Drill are numerous examples of specially designed attachments as well as of special basic design of machines. Some are little things, but many are of major significance. They are in use virtually throughout the sequence of operations.

When the rods of raw steel go into the cut-off department, girls reduce them to lengths for bodies and for shafts of drills on abrasive cut-off machines. Here the grinding wheels are carefully guarded, not only with metal but also with safety glass. Such protection takes fear out of the girl's mind, makes her feel safe.

### Special Chute Increases Output

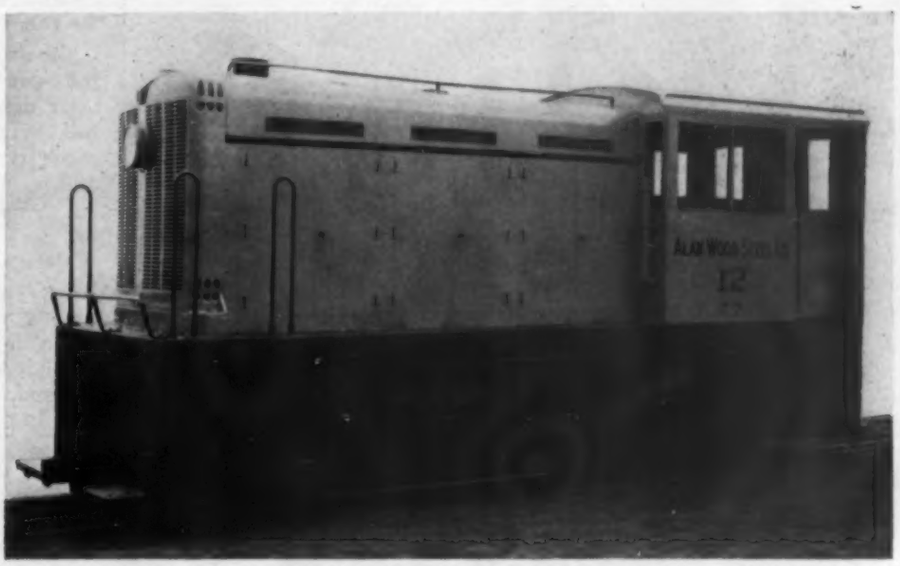
An outstanding example of a specially designed attachment for a standard machine—a device for achieving easy operation, comfortable work and safety—is found in the centerless grinders used to make drill bodies perfectly cylindrical. Ordinarily where men operate centerless grinders in drill manufacture, they have fed the machines by hand.

Republic officials noted that such an operator often is away from work on account of minor abrasions and finger cuts so they designed a special chute which enables the girl operator at each of these machines to feed quite a number of these pieces of steel into it at one time. She does so as easily as a restaurant cashier clicks coins out of a change box. Furthermore, the special equipment includes a device for holding the successive drill bodies in position between the grinding wheels. *A by-product has been a 50 per cent increase in production per machine.*

One of the batteries of specially designed machines is made up of milling machines, each with five spindles for cutting the flutes in the bodies of small drills. On these millers the principal controls are waist high. These machines are so easy to operate and so close together that each operator keeps from two to four of them going.

For grinding the cutters for milling machines, an operation traditionally for

# *Whitcomb* CONSISTENTLY



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**35 years experience in making the best industrial locomotives our skill and ingenuity can devise is your assurance that: WHITCOMB locomotives are the ideal mobile power units for switching and haulage service; they are rigid in economy; they can work for long hours, giving top performance at lowest cost; their long life keeps maintenance costs down, and their abundant, easily controlled power is just that much more energy devoted toward eventual victory.**

**For industrial locomotives, see WHITCOMB.**

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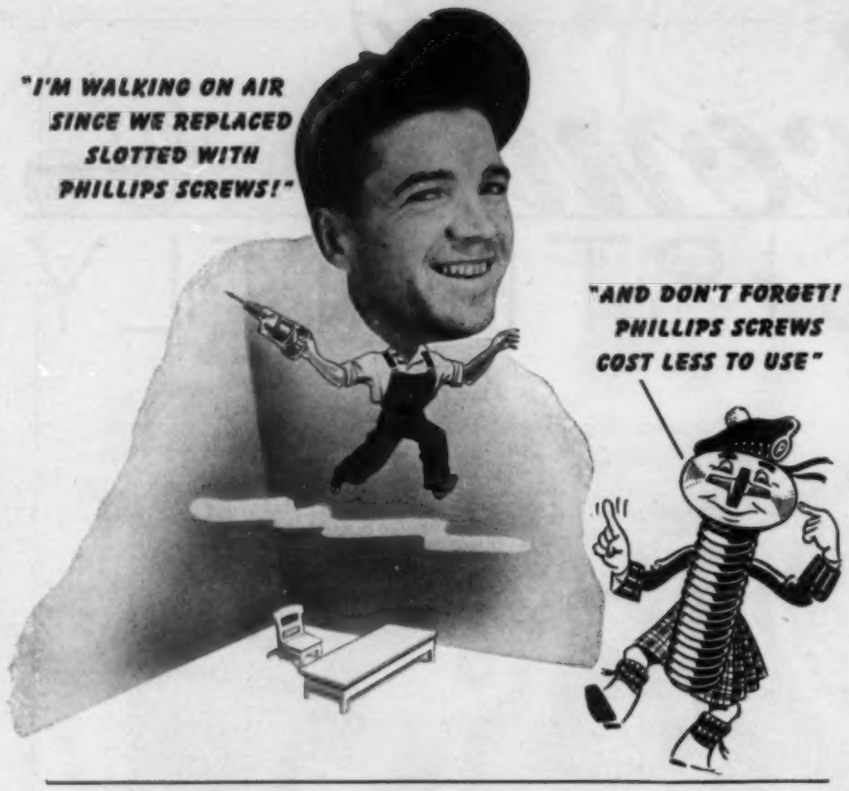



## Easier Work • Less Fatigue • No Production Slumps = 50% Less Assembly Time with Phillips Screws

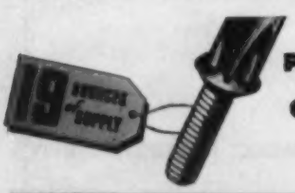
Take a man who is being asked to put his "all-out" effort into assembly work.

You have been giving him slotted screws. Did *you* ever try to *speed up* using slotted screws? It's just inviting trouble, that's all; if you aren't slow and cautious, you'll end up with split screw heads, screwdriver scars and loose assemblies.

But give that fellow *Phillips* Screws and watch him go — particularly if he was using a hand driver before. With Phillips he can use power drivers — electric or pneumatic — for there's no danger of the driver point escaping from the screw recess. It's just a matter of . . . point the driver . . . and let her go. Phillips Screws drive straight automatically and can be "rammed home" without danger of the heads splitting.

No wonder a changeover to Phillips makes such a difference in output — quality — and employee morale. And the big saving in time also means an average of 50% saving in *cost*.

Write to any of the firms listed below for further facts.




**PHILLIPS RECESSED HEAD SCREWS GIVE YOU 2 for 1** (SPEED AT LOWER COST)

WOOD SCREWS • MACHINE SCREWS • SHEET METAL SCREWS • STOVE BOLTS • SPECIAL THREAD-CUTTING SCREWS • SCREWS WITH LOCK WASHERS

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Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N.H.
The Charles Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N.Y.
Pawtucket Screw Co., Pawtucket, R.I.
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Scovill Manufacturing Co., Waterbury, Conn.
Shakeproof Inc., Chicago, Ill.
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Whitney Screw Corp., Nashua, N.H.


men only, a row of grinders operated by young women will be found in this plant. Here an attachment of special design simplifies the operation, and a sloping frame of safety glass affords protection from flying particles.

Rows of clearance-grinding machines are conspicuous for special features designed to aid the girls in the seats from which they are run. These features include a pushing device operated by a touch of the foot to send the drill through the machine, a guard to keep the operator from getting spattered with coolant, and wooden floor grills over the base pans to keep her feet dry.

To simplify the precision work on point-grinding machines, Republic engineers designed a slide that moves on ball bearings and adapted a special chuck, not only to hold the point of a drill on the wheel at the current angle but to make the operation simpler and easier.

Likewise on a spinning lathe for finishing work on the joining of body and shank of a drill, an extension hand lever makes it easy for a girl of average strength to apply the extreme pressure required.

### Safety Stressed Greatly

Every drill goes over straightening tables, although not all require straightening. The first move here was, as elsewhere, to surround three sides of each table with steel partitions. That protected each operator from any flying pieces of hot metal from an adjoining table. Then to protect the operator at each table the arbor press for the operation was surrounded by a metal guard with a window of safety glass.

Posture chairs are used at all machines and tables where women work seated. One of the foremen developed a rod that makes the back adjustable, not only up and down but also forward or back as required. Then it was found that the footrest on those chairs in the form of a short arc left one foot dangling. An adjustable footrest attached to the frame of the machine was an improvement that provided added comfort for the women operators.

A provision in the tote pans renders it impossible for a woman in this plant to overstrain in lifting. These pans are made so small that pan and contents cannot weigh over 33 pounds, a weight which the company doctors agree can safely be handled by women.

With guards covering moving parts of machines, hair nets given free to girl operators, shatter-proof goggles and employes carefully trained, Republic Drill has a super-safety program. Great care is taken to protect facial beauty. "But no matter how careful any management may be, accidents will occur in a pro-

# *Available without Priority*

## FOR MAINTENANCE AND REPAIRS

Rebuild worn parts — conserve precious steels, save time, save money — and aid the war effort by welding.

For hard surfacing, resistance to wear, abrasion, and impact, P&H Alloy Electrodes may be obtained without priority. The only restriction is that the electrodes be used for maintenance and repair work.

P&H is ready to help you: First, in making available a full line of alloy electrodes for hard surfacing, welding of stainless steels, 4-6% chrome steels, etc. Second, by answering your specific questions as to the proper choice and applications of electrodes to solve your maintenance and repair problems.

See your nearest P&H welding representative or write us for the list of P&H Alloy Electrodes along with recommended modern welding procedures.

### P&H-HANSEN WELDERS

Square frame design permits stacking of machines for single or multiple use with instant parallel hook-up. In either case single control provides any desired welding current with automatic arc response on all classes of work. Simpler, more accurate, easier to learn. Write for Bulletin W-28 for complete information.

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## TO SUB-CONTRACT PROBLEMS

## Call ON EXPERIENCE AT OUR 3 PLANTS

For fabrication of metal parts and finished products . . . take advantage of All-Steel-Equip facilities. With a rich background of 30 years experience in sheet metal fabrication, A-S-E is well-equipped to take care of your sub-contract work . . . promptly and efficiently.

There are three factories, complete with trained men and machinery for shearing, forming, stamping, drawing, welding, brazing and assembling. A capable engineering staff, directed by alert management, is ready to help you with your production problems.

Let us help you work out your sub-contract problems quickly and effectively. Send your blueprints with specifications and delivery requirements for prompt quotations. Mail coupon.

### ALUMINUM WELDING

▲ *A-S-E has complete facilities for fabrication of sheet metal from 7 to 30 gauges.*

◀ *New "stored energy" type of welding equipment is now available for sub-contract jobs.*

**ALL-STEEL-EQUIP COMPANY, INC.**
612 Archer Ave. Aurora, Ill.

☐ Send me the booklet showing the facilities and production capacity of the three All-Steel-Equip Company plants.

☐ Have an A-S-E representative call.

Name .....

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City..... State.....

duction shop," said Mr. Reinhart. "With us, when unavoidable accidents occur, a good doctor and nurses, available on all three shifts, see that they are attended to properly. If the injury might result in disfigurement, even though slight, the services of a plastic surgeon are employed at no cost to the victim."

The mechanical engineering feature of this program for safety, ease of operation and comfort for women workers are supplemented by an equally advanced program on pay, selection, training, supervision, rest periods and recreation.

All employes, the 80 per cent women and 20 per cent men, are paid on an hourly basis. There is also a monthly profit-sharing bonus plan for them. "Piece rates are no good in prosperous times or depression times; they can't be set fairly," said Mr. Reinhart. "Hourly pay is better for girls or anybody—always providing, of course, that the incentive to produce is retained through the adoption of some plan to replace the piece-rate system."

**Relatives Are Taboo**

This company does not employ the sister, cousin or other relative of an employe. "I couldn't get a job for my own daughter," said Mr. Reinhart. One source of applicants is the United States employment service.

Applicants are interviewed first by the well-staffed personnel department, headed by a physician. It is also the medical department. Those accepted as mentally, morally and physically qualified for work at machines are sent to a department foreman, who does the actual hiring. After a foreman hires a girl, she goes back to the personnel and medical department for a thorough physical examination, including eye tests by an oculist. If her vision needs correction, her set of the shatter-proof glasses that each employe must wear at work is ground to the prescription she needs.

After a young woman has passed these examinations, she is given three weeks' training in the department where she has been hired. The trainees in the various departments are distinguishable because they wear red uniforms, whereas the women who have passed the training period wear blue. These uniforms are dresses supplied and laundered by the company at its own expense.

Actual supervision on the job is done by the foremen. So far the company has found that women prefer to be bossed by men. They say foreladies are too exacting in minor matters. But this company supplements the work of the foremen, among whom the fatherly type is best, by activities of women counsellors from the personnel and medical department.

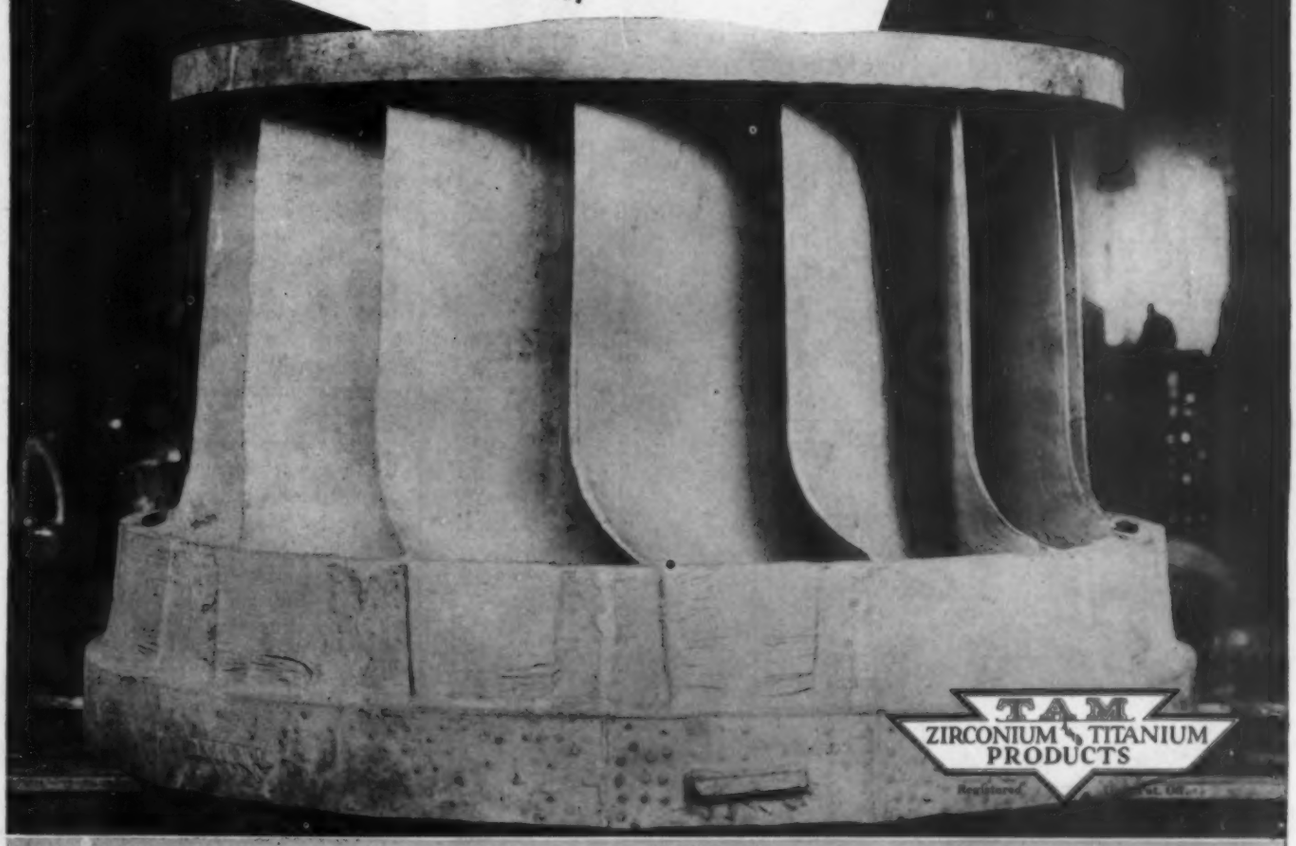
# SMOOTH FACES FOR CASTINGS

**TAM Zirconite super-refractory mold and core washes produce smoother surfaces and reduce cleaning costs**

By resisting the burning-in of the molten metal, TAM Zirconite Mold and Core washes speed up output of good castings by reducing the number and time of cleaning and finishing operations. Available in three grades: Zirconite A has a melting point above 3775° F.; Zirconite B has a melting point above 3600° F.; and Zirconite C, for special uses, has a melting point above 3600° F. They are quickly mixed by adding to water, and can be applied by either spraying, swabbing or painting on cores and molds. Write for complete details, today.

**TITANIUM ALLOY MANUFACTURING COMPANY**

Zirconite Wash was used on this 94,000 pound .30-.35 carbon steel casting—11'6" high 14' diameter. Of special interest is the fact that no nails were used in the facing.

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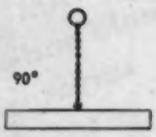
# "Right Angle" or Wrong Angle

## *Check the load*

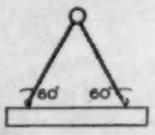
Do your men know what you know—that as you reduce the angle of sling chains you lower their carrying capacity? For a simple, quick way to compute the safe load from 90° to the risky, small angles, consult the table at the right. Other important precautions which will prevent accidents and save chain will be sent you on request. And we'll gladly help you with your wartime chain problems if you'll put them up to us.

*American Chain*

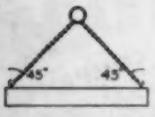
**How to Find the Safe Working Load for Sling Chain at Different Angles**



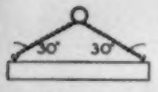

To find the safe working load for a Single Sling Chain at 90° angle—multiply the manufacturer's recommended safe working load by 1.



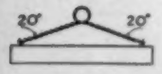

For a Double Sling Chain at 60° angle—multiply by 1.732.




For a Double Sling Chain at 45° angle—multiply by 1.414.

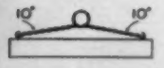



For a Double Sling Chain at 30° angle—multiply by 1.000.

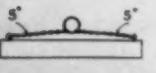



For a Double Sling Chain at 20° angle—multiply by 0.684.

For a Double Sling Chain at 15° angle—multiply by 0.517.




For a Double Sling Chain at 10° angle—multiply by 0.346.




For a Double Sling Chain at 5° angle—multiply by 0.174.

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The company has not committed itself against advancement of women to supervisory positions. On the contrary, it hopes to be able to do so. Already one of the assistant safety supervisors is a "career girl", trained both in safety engineering and in nursing. In the production departments, women trainers help the foremen in the three weeks' training of each new operator. In most departments there are women who do the setup work.

Advanced jobs for women at Republic Drill will not become available by women's replacing men for there are comparatively few men in the organization. Those called by the draft will be restored to their places when the war is won. But this is a women's workshop, and it is expected that its expansion will see increasing opportunities for women.

### Plenty of Recreation

The company has recently added a one-story structure for fabrication work and a two-story structure which is used for recreation rooms and for a cafeteria to supersede its canteen. Not content with its mandatory rest period for women after any 2 hours of work, extensive provision is made for recreation both before and after hours. The staff includes a recreation director. The women workers have a riding club, a skating club and a bowling league—the latter with 46 teams.

While the shatter-proof glasses give them a scholarly appearance, the girls seem to be as vigorous as athletes. Probably any one of them could make it hot for a street rowdy, but the company has secured police protection for workers on both night shifts so they can go to and from the nearby elevated, street car and bus stations free from any annoyance.

The women show marked enthusiasm for their war production work. There is a spirit of zip in the plant that a visitor can't miss. And for year-in and year-out efficiency, Mr. Reinhart says the result of the company's policy is that "women are now functioning with an excellence of performance far beyond expectations held by the management—in many instances with considerably greater efficiency than men".

*Since women exclusively are employed for machine operating in this metalworking plant, its experiences set out in high relief methods for making factory work attractive to them.* They support a general point made by the management in a communication to the National Business and Professional Women's League: "It is our firm conviction that in plants where it has only been possible to employ women on a limited scale or where their efficiency is not as great as that of

men, *it is the fault of the management rather than of the women.*"

This company's experience certainly shows that it is entirely practicable for a company management to adapt many of its metalworking machines for operation by women in work they can enjoy and handle efficiently. Now when every available source of labor must be utilized effectively, the lessons brought out here should be of immense value in showing plant management how to employ women effectively.

## User Report on NE Steels

(*Continued from Page* 72)

tempering temperature and compared with the range obtained with the same size bolts made from A-3140, A-4042 and A-4140 steels. It will be noted that the tempering temperatures required to meet the hardness requirement of 30 to 38 rockwell C are on the high side of the range for A-3140, A-4042 and A-4140.

From Fig. 8, it will be noted that the curves for NE-8339, NE-8442 and NE-8739 show that the steels will have sufficient hardenability to develop maximum properties.

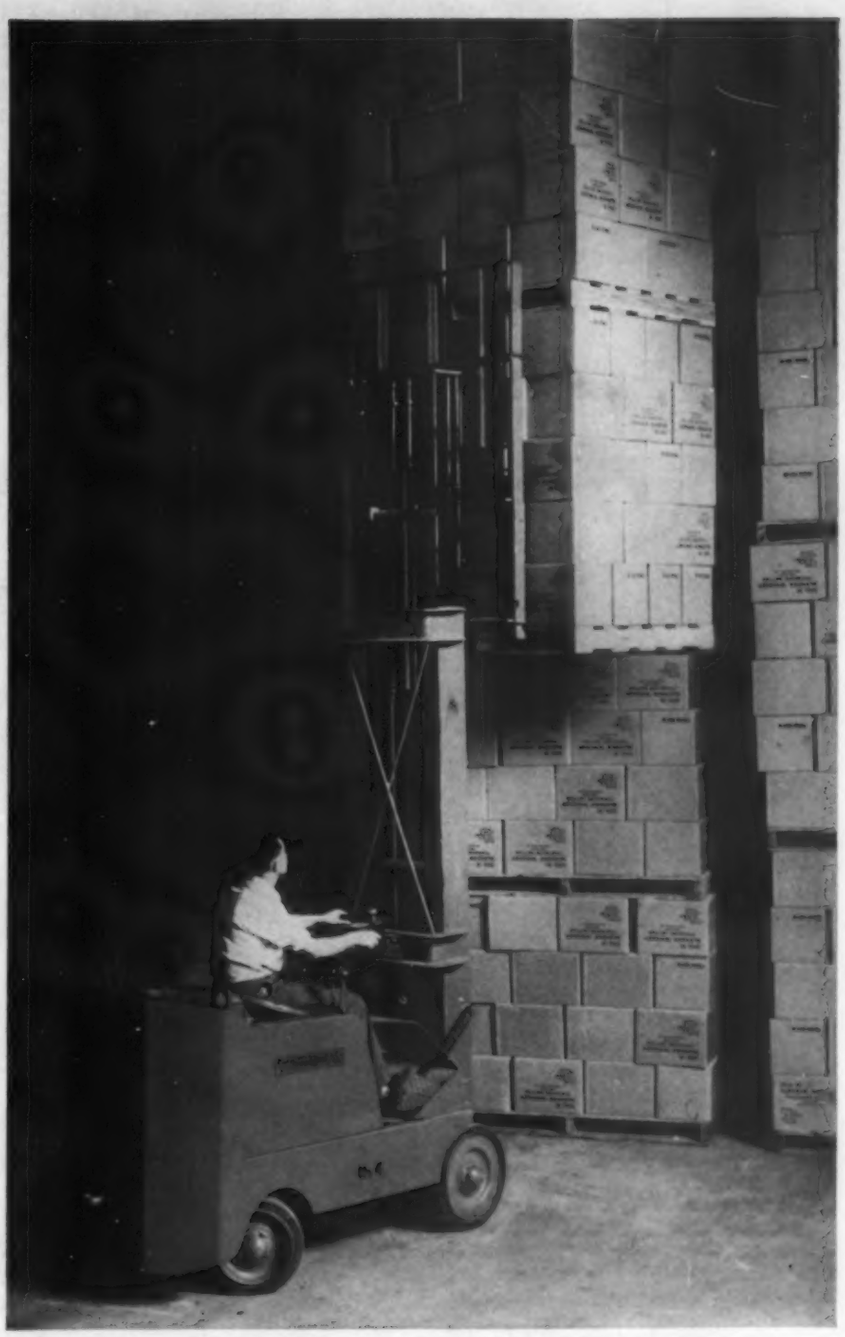
In Fig. 9, tensile strength is plotted against per cent elongation in 1½ inches for the heat-treated ½-inch bolts. It has been noted previously that a minimum elongation of ⅛-inch over the length of the bolt is desirable. This value is a little high for bolts under 2 inches in length and low for bolts over 4 inches in length; however, it is the best guide apart from a bend test for measuring the toughness value of a bolt. This elongation would represent 6 per cent in the particular bolt tested.

It will be noted from Fig. 9 that NE-8339 and NE-8442 have a low elongation value for a given tensile strength.

*The data given in this article indicates that NE-8339, NE-8442, and NE-8739 could be used as bolt materials.* There appears to be no particular reason for the use of NE-8442 where NE-8339 is available for the difference between the two steels is so slight that use of the higher molybdenum content is wasteful, at least for this application.

NE-8739 is decidedly to be preferred over the NE-8300 or NE-8400 series steels because of its higher toughness value for a given tensile strength.

It should be understood that the information given for bolts is based on the product of one heat only and is not intended to be a general recom-



*One man, one machine, one plant can increase production tremendously when all movement of materials is correlated with*

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***THE 24-HOUR ONE-MAN-GANG***

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mendation but rather should be used as a guide to be supplemented by the user's own tests.

## Co-ordinates Paint, Light

(*Concluded from Page 74*)

machine-tool operations on ferrous metals. Buff is not only satisfactory for machine-tool operations but for other applications as well. However, sufficient demands for other hues justify more study of the entire spotlight painting problem. It is important to select a color with high reflection value, having a satisfactory contrast with the material being manufactured. The color should be one which will continue to be stimulating and comfortable to the workers. Weak colors, those of low chroma, are more comfortable on surfaces continuously in the line of vision, it has been found.

If properly executed three-dimensional seeing provides positive visibility with finishes having high reflection factors by means of adequate contrast hue, an overall contrast not too harsh to prevent continuous comfortable seeing, a color sensation which is psychologically pleasant and easy to live with. Buff has been found to meet these conditions satisfactorily. Its reflection value is high, 68 per cent. Chroma is quite low, and psychologically the color has a high degree of acceptance. Green even more closely conforms to theoretical specifications with the reflection value also 68 per cent. A yellow-green hue with low chroma, although not as low as buff, is especially popular in the textile industry.

Horizon gray, an achromatic or neutral color will probably hold a prominent place as a background color. A 34 per cent reflection value is high as compared with existing practice, although not as high as could be profitably utilized on horizontal surfaces.

As a part of the industrial seeing setup, the function of color is to provide a mild controlled stimulation and to increase visibility by means of suitable contrasts. Brilliant colors, bright red or yellow, stimulate impulsive action and are danger or caution indicators. Their use produces pronounced stimulation deliberately for instant reaction; preventive action must be instantaneous to reduce accidents. Achromatic colors — gray, for instance—have a deadening effect if used to the exclusion of chromatic shades or those having strong hue and chroma characteristics.

Between strong chromatic color and achromatic lies the position of continuous, comfortable, accurate vision with a minimum of fatigue. The need for the correct degree of stimulation within the working area cannot be overstressed. It is equally essential that the hue and brightness of surroundings, including floor and ceilings, be of such character as to emphasize a return of the eyes to the working area with the greatest comfort there. These areas should also have an adequate reflection value to insure maximum use of multiple reflections.

Numerous large-scale installations of co-ordinated paint and lighting systems have been found exceptionally valuable in the last year—notably in war production plants. Light-color floor and table finishes give better visibility on all sides of parts under construction in the assembly line of Fleetwings Inc., one instance in the aircraft industry.

A gray floor having a reflector factor of 60 per cent greatly improves the visibility of work on the various machine tools at the repair machine shop of the Philadelphia Electric Co., particularly when brass and copper are being fabricated. A combination of neutral green machines and light cream tables increases the illumination at the needle more than 100 per cent at the sewing tables of a Marine Corps Quartermaster depot.


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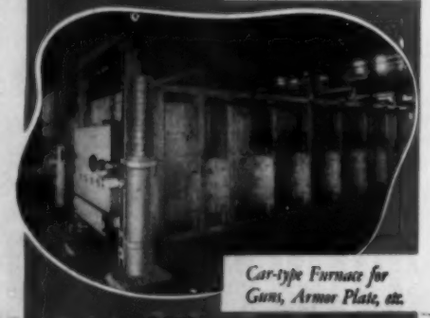


*Car-type Furnace for Guns, Armor Plate, etc.*

The Amsler-Morton Company

FULTON BUILDING • PITTSBURGH, PA.

## Film Refining Process

(*Continued from Page 87*)

causing the newly formed oxides, specially ferrous oxide and manganese oxide to remain entangled or emulsified within the molten steel and powerful deoxidizers are needed to reach a portion of the entangled oxides and form either gases or lighter oxides which will rise to the surface of the molten steel. It is like expecting cream to rise over constantly agitated milk. In contrast to the foregoing, the film-refining process acts upon these oxides and removes them with the effectiveness of a centrifugal cream separator.

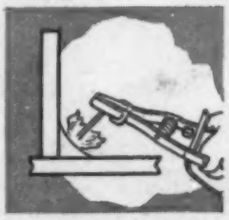
The process is effective both on blast furnace or cupola iron, as well as molten iron diluted with a proportion or remelted steel scrap. The use of steel scrap is not necessary with this new process and has no effect on the time factor of operation. Considering that either a batch or a continuous amount of molten iron or molten steel is available to be refined into steel, that molten oxidizing slag and molten lime slag are available and that the refractory cylindrical linings of the two refiners have been duly preheated to about 2400 Fahr. skin temperature, the refining operation is effected, as follows:

Simultaneously and continuously a stream of molten slag and a stream of molten iron or molten steel are poured into the first refiner through the pouring boxes provided for this purpose. The rate of flow of both streams will correspond to the rate of refining desired, per minute, 1, 2, 3 or more tons. The lining in the first refiner will be basic, sintered magnesia brick, or neutral, Mullite brick. It will be immune both to the action of molten iron or molten steel, as well as to the action of the oxidizing slag. It would be attacked by the acid slag formed after oxidation of silicon and manganese, but contact with this acid slag is effectively prevented. Consequently in a vertical refiner, the oxidizing slag is directed first against the rotating refractory lining and will form a cylindrical film moving downwards. Immediately underneath it, the molten iron or steel stream will be directed against the rotating refractory lining and will form a cylindrical film over the molten slag film and both films will be kept moving downwards. In this way a pressure contact over a large surface is created and maintained between molten metal, as both move downwards toward the delivery end of the refining cylinder.

It is easy to understand what happens to the materials of both films kept in forceful contact. First, an enormous surface of contact has been positively established between the two materials when at temperatures most favorable for the oxidizing reactions. Second, under centrifugal action, the molten iron or molten steel of higher specific gravity will be driven to the periphery through the film of molten slag of much less specific gravity, forcing the lighter slag material in the inside of the composite traveling film. Third, as a result and in addition to an extended surface of contact, a uniform and complete penetration of the oxidizing slag through the molten iron or steel is created mechanically and effectively. Under the foregoing conditions, the oxidizing reactions between molten metal and slags which require such a long time in open-hearth and electric furnaces, are effected in a film-refiner in a period of time so short that they can be considered as instantaneous. Fourth, all particles of molten metal being forcibly brought in contact with the oxidizing slag, the oxidation of the metalloids is complete and not limited as in present furnaces. Fifth, the release of gases evolved during the carbon oxidation is facilitated under the film disposition. Sixth, the layer of

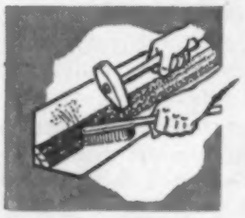

# HOW TO SAVE UP TO 40% OF WELD METAL IN FILLET WELDING

**Murex engineers have long advocated the welding technique illustrated here, in order to reduce the amount of electrodes used on fillet welds. Savings up to 40% of weld metal can be achieved with this method. In addition, stronger welds are produced and production is speeded. Because of the serious electrode shortage, adherence to this technique makes an important contribution to our conservation program.**

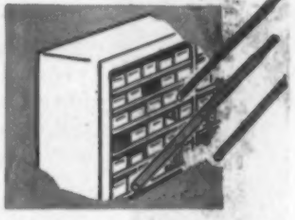


Holding the electrode at the proper angle will give the most effective deposit of weld metal. In downhand work, the electrode should be held at an angle of 45° to 50° to the horizontal plate and about 20° off the vertical, leaning in the direction of the welding.

Where multiple passes are used in fillet work, the beads should be laid from the bottom upward in the sequence, as shown. Valleys may be avoided by using an intermittent weaving motion, occasionally flicking the arc to feather edge the metal being deposited into the previous bead.



Cleaning time can be saved by leaving on the slag until each layer of beads has been completed instead of cleaning each separate bead.



Select a type of rod, of the largest size practical, that will permit the use of high currents, taking into consideration thickness of plate, amount of penetration and soundness of deposit required.

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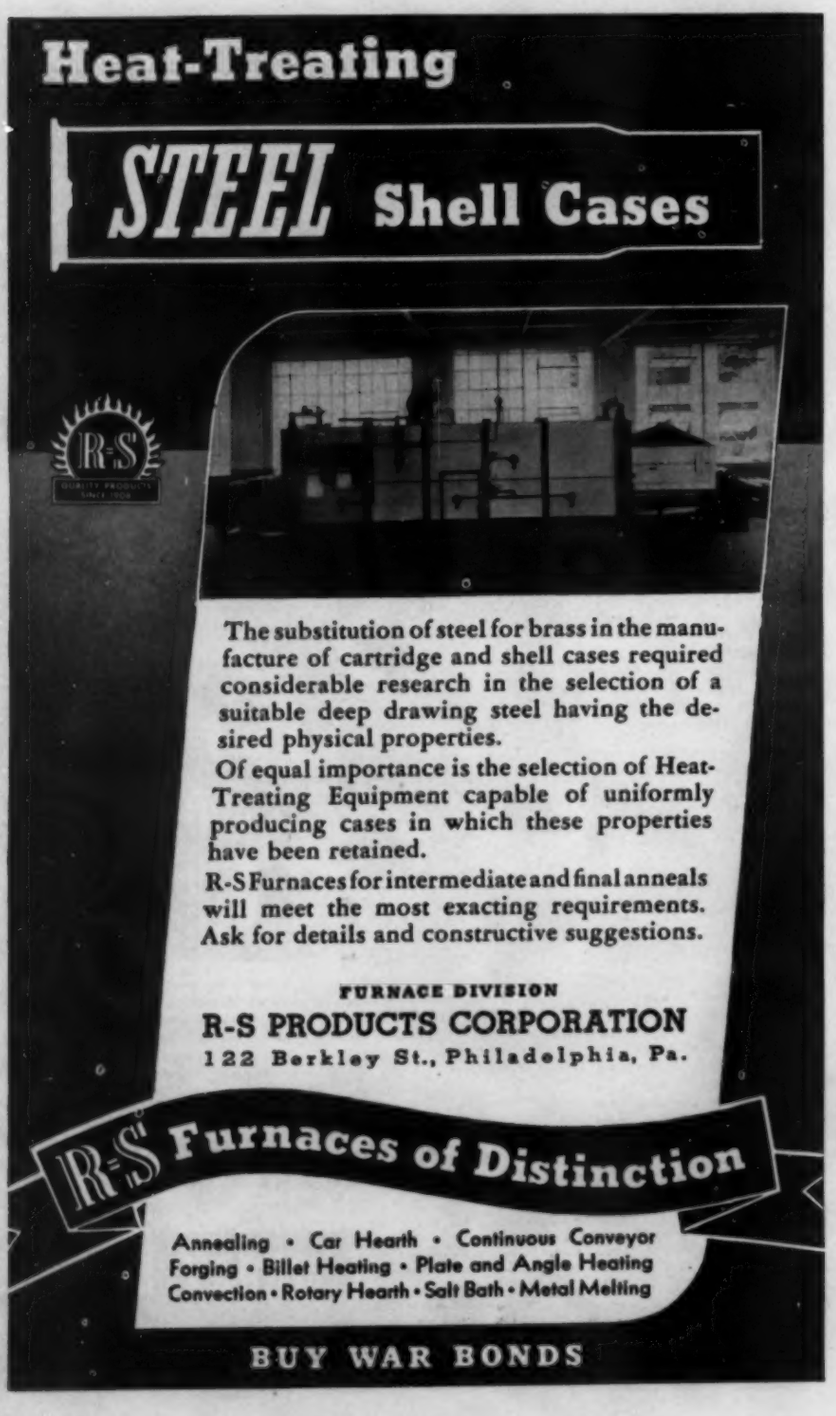
molten slag, as it passes through the molten iron changes in composition and is transformed into a mixture of: $SiO_2$, MnO, FeO, CaO and may contain most of the phosphorus of the molten iron in the form of $P_2O_5$, if the pouring temperature of the iron was low, such as delivered by mixers. Seventh, complete and effective centrifugal separation between the molten steel and the above slag is effected while both films travel downward towards the delivery end of the machine and this centrifugal action removes most of the oxides and inclusions contained in present steels. Eighth, this acid slag, under centrifugal action, is kept inside of the cylindrical film of molten steel and cannot come in contact with the basic lining. Ninth, the film of acid slag is continuously separated from the refined steel by an adjustable circular skimmer and led out into a receiving slag box, preventing any possibility of chemical reversibility. Tenth, the heat generated by the chemical reactions is fully retained by the molten steel film and the steel produced, as it is collected into a receiving ladle or led into a second refiner, is very hot, generally above 3000 degrees Fahr. Unless the slag composition has been adjusted to retain a percentage of carbon, the molten material produced is really ingot iron or pure iron, in a state of purity which cannot be obtained under present methods.

The foregoing conditions of operation can be obtained with oxidizing slag and with dephosphorizing lime slag. With a slag capable of attacking the refractory lining, this slag will be directed to form a film over the film of molten metal to react under the tremendous surface of contact created.

Steelmaking will generally involve two slag refining operations requiring refining units which can be used in different ways depending on the composition and temperature of the molten iron or molten steel to be refined. For example, blast furnace pig iron, unless it is produced in a charcoal stack will have to be desulphurized first with alkalies, in the usual manner or with a special film-refiner. This desulphurized iron, generally around 2300 degrees Fahr. can be treated in the first film-refiner to remove all the phosphorus, silicon, manganese and carbon down to about 2 per cent. This material can be made to flow directly and continuously into the second film-refiner where it will be subjected to another film of oxidizing slag whose amount will be controlled to bring the carbon to the exact percentage desired. The steel produced will be collected into a receiving ladle to which the required amount of silicon and manganese for composition adjustment will be added, preferably in the molten state while the steel is kept under a slag layer. With hot cast iron from a cupola or a mixture of steel scrap and pig iron melted in an open-hearth or electric furnace, the following equipment will be used: Cast iron first is desulphurized. The molten iron or steel is treated in the first refiner with an oxidizing slag, as previously described, to remove all the silicon, manganese and all or most of the carbon contained. This material then is treated in the second refiner with a lime slag to remove the phosphorus and reduce the sulphur content. The composition adjustment and deoxidation are effected in the receiving ladle, as indicated above, the steel being covered with slag until it is poured.

In all cases, the material treated does not need to be reheated or remelted between operations; the required refining operations are carried out on the original molten metal by proper appropriation of the heat liberated by the oxidizing reactions.

As previously indicated, the necessary composition of the oxidizing slags is determined by the amount of metalloids contained in the molten metal to be re-



Heat-Treating
STEEL Shell Cases
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The substitution of steel for brass in the manufacture of cartridge and shell cases required considerable research in the selection of a suitable deep drawing steel having the desired physical properties.
Of equal importance is the selection of Heat-Treating Equipment capable of uniformly producing cases in which these properties have been retained.
R-S Furnaces for intermediate and final anneals will meet the most exacting requirements. Ask for details and constructive suggestions.
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fined and from this the required weight of slag is calculated. For large production, an extra amount of slag is provided to allow for possible variations in the chemical composition of the molten iron. Quick test of the composition and operative temperature of the prepared slag can be made in a few seconds on 200 to 300 pounds of the molten iron. Necessary adjustments can be made quickly. When operative conditions have been established giving the exact results wanted, these conditions can be maintained for production of large tonnages and are easy to reproduce and maintain for every day production. The factors of control are all mechanical or by instruments: Composition of iron (analysis), temperature of metal and slags (pyrometry), rate of pour (nozzle sizes) or by mechanical devices, composition of slags before and after operation (analysis), speed of rotation of the refiner (tachometer), etc. No human factor is necessary after the operating procedure has been properly established and this applies both to large scale production in steel mills and to intermittent production in steel foundries. Easier schedules of production can be prepared with this new process. It many cases night work can be entirely eliminated and interruptions do not affect the efficiency of the process and do not cause extra cost and expenses, as with out present refining furnaces.

In conclusion, the film-refining process makes possible the production of cleaner and better steels and alloy steels with less oxides and inclusions. It permits the production of a low cost, pure ingot iron, which can be used as such or can be used in the molten state as a perfect base for the production of most alloy steels.

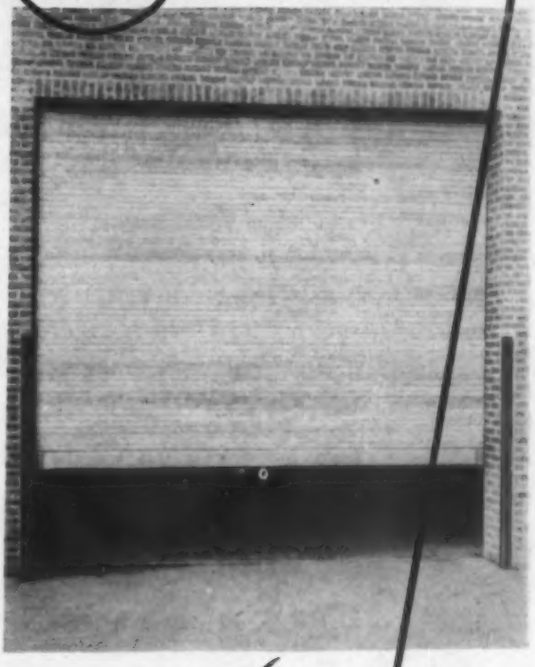
It makes available a much cheaper cost of production for both common steel and alloy steels, on account of the considerable savings in: fuel, power, refractories, labor cost, maintenance cost, capital investment.

It makes available new methods of producing alloy steels. Iron from the blast furnaces or cupolas can be refined into pure iron and to this hot pure iron, ferroalloys either in lumps or molten, can be added to make most of the alloys in general use. For example: Low alloy steels, silicon steel used for electrical sheets, manganese steel both low and high carbon, high-speed steel for tools, etc. When necessary the alloys to be added can be melted in a small arc furnace or high-frequency furnace. For the production of stainless steels, this would permit a lower carbon content than now practicable, or the carbon could be made higher when required. Some alloys could even be melted in the cupola, charging pig iron, alloy steel scrap and nickel or other alloying element in the form of ores and the alloyed molten iron could be refined into clean alloy steel, with low carbon content if required.

This is the only process which will make available, steel or alloy steel in any amount, not dependent on the size of the refining furnace used. It is also the only process, making steel or alloy steel continuously available for continuous production, such as is required by mechanized foundries. Using the continuous cupolas, now available, all gray iron foundries could be transformed into continuous steel foundries, using their mechanized casting equipment, by the addition of these film-refiners.

Under this new procedure, steelmaking and production of common steel and alloy steels, will no longer be an art but an exact and controlled operation. This will make production of high-quality steel and alloy steels a simple matter, whether practicized by old established steelmakers or by new ones. This new procedure can be applied to the refining of other metals: nickel, cobalt, copper, aluminum, magnesium, etc.


DOORS THAT *SAVE* TIME AND SPACE and CONSERVE *STEEL* FOR WAR NEEDS



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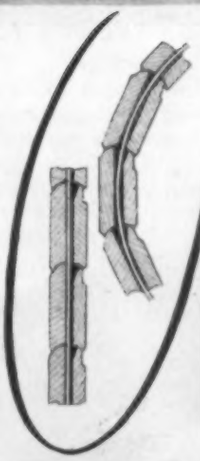
**Constructed of inter-lapped wood slats jointed with metal cables or tapes, they coil above the opening, remain out of the way and out of reach of damage, and require no usable floor, wall or ceiling space for either storage or operation. The rugged curtain assembly offers a high degree of protection, and blocks out wind and weather. The illustrations at right show the design of the wood slats, how the slats are assembled, and how they permit the curtain to flex without binding the metal tapes. Kinnear Wood Rolling Doors are available in any size, with motor, manual or mechanical operation. Write for complete details!**



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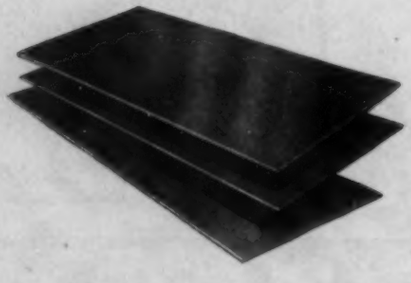
We're giving it all we've got to boost the production of our war-essential products . . . and, every department in our mills already has knocked the ceiling off all our previous production records. Rolling through our mills in thunderous procession are unprecedented tonnages of quality steel plates destined for uses of most critical importance . . tonnages that help bring closer the day when once again we will be able to serve freely *all* our friends in these free and United States.



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SHEARED STEEL PLATE

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**WORTH STEEL COMPANY · Claymont, Delaware**

# Less Pressure Felt on Some Steel Products

*Rapid change in war requirements causes uncertainty. . . . Some orders suspended, others canceled. . . Tight situation continues in many products. . . Scrap supply tightens*

**DEMAND**
*Lighter on some products.*

**PRODUCTION**
*Down ½-point to 99 per cent.*

**PRICES**
*Unchanged.*

EXCEPT for alloy steels, cold-drawn bars and large bar rounds pressure is off most steel products. New buying is spotty, requests are being made to hold up shipments and some cancellations are being filed.

Suspensions have been asked in plates, small bars, sheets, shapes and some other items. These suspensions are attributed not only to lack of urgent need but also to the fact that inventories have reached a point where further supply is not needed. In a few isolated instances tonnage placed months ago has appeared suddenly, after the need had passed. Some jobbers recently have received shipments of specifications which would have been most desirable a few weeks ago but which now may take considerable time to move, so rapid is the change in demand under present conditions.

Outright cancellations are less numerous but still in evidence. Some doubtless are due to orders placed with more than one seller, first shipment being accepted and others revoked. Better delivery promise by another mill is another cause. Earlier in the fall widespread cancellations followed drastic cuts in PRP quotas. Then and more recently considerable tonnage has been wiped off books, due to changes in the armament program and further such action is expected over coming weeks.

• • •

Sheet deliveries average about eight weeks, with some mills able to offer six to seven weeks, all on top priorities. Hot carbon bars may be obtained in about eight weeks on small sizes and 14 to 16 weeks on larger rounds. Shapes are easiest, available in four weeks in some instances.

Preparations are under way to provide heavier output of plates in 1943, to support an enlarged shipbuilding program. More steel will be channeled to plate mills to provide ship material. Restrictions on use of plates in other fabrications has cut miscellaneous demand to a low point, thus improving the situation.

War Production Board is somewhat more liberal in permission to railroads to buy freight cars and locomotives and as a result numerous lines are making requests for additional new rolling stock. A large part of the locomotive requests is for diesel-powered units.

Request by the War Production Board that more bessemer bars be utilized in cold-drawn bar production has not produced much change as government procurement agencies are slow to revise their specifications. Change in this respect is expected to be slow.

Due to necessity for repair of hard-worked open hearths and in one instance to lack of scrap, steel production last week declined ½-point to 99 per cent. Cleveland gained 1 point to 93½ per cent, Buffalo 2½ points to 93 and New England 4 points to 96. Pittsburgh dropped ½-point to 98½ per cent, Chicago 1 point to 100, eastern Pennsylvania 1 point to 95, Cincinnati 5 points to 87, St. Louis 7 points to 87 and Detroit 3 points to 92. Youngstown remained steady at 97 per cent, Wheeling at 86½ and Birmingham at 95.

• • •

Indications are appearing that the scrap scarcity may develop before midwinter. The bottleneck is inability of scrap yards to collect and prepare the tonnages gathered at various centers in the fall salvage drive, as trucks and manpower are lacking. This first signs appeared last week when a midwestern steelmaker was forced to take off open hearths because not enough scrap was available. Some interests with mills in several locations are shipping material from one to another to maintain production. In addition to labor shortage preparation is slowed by adverse weather conditions. While a winter shortage was foreseen it seems likely to become effective much earlier than had been expected.

Great Lakes navigation season has closed with a total of 92,076,781 gross tons of iron ore delivered at lower lake ports, surpassing the best prior record, that of 1941, by 11,960,421 tons, 14.93 per cent. December shipments were cut short by adverse weather conditions and only 635,829 tons were loaded, 199,252 tons less than in December last year. This was a loss of 25.86 per cent. Reserves at furnaces and on docks are larger than last year and are deemed sufficient for winter demand at the high steelmaking rate now current.

Composite prices, frozen by Office of Price Administration, are unchanged. Finished steel continues at $56.73, semifinished steel at $36, steelmaking pig iron at $23.05 and steelmaking scrap at $19.17.

# COMPOSITE MARKET AVERAGES

| | Dec. 19 | Dec. 12 | Dec. 5 | One Month Ago Nov., 1942 | Three Months Ago Sept., 1942 | One Year Ago Dec., 1941 | Five Years Ago Dec., 1937 |
|---|---|---|---|---|---|---|---|
| Finished Steel | $56.73 | $56.73 | $56.73 | $56.73 | $56.73 | $56.73 | $62.18 |
| Semifinished Steel | 36.00 | 36.00 | 36.00 | 36.00 | 36.00 | 36.00 | 40.00 |
| Steelmaking Pig Iron | 23.05 | 23.05 | 23.05 | 23.05 | 23.05 | 23.05 | 22.90 |
| Steelmaking Scrap | 19.17 | 19.17 | 19.17 | 19.17 | 19.17 | 19.17 | 13.40 |

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

# COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

| Finished Material | Dec. 19, 1942 | Nov. 1942 | Sept. 1942 | Dec. 1941 |
|---|---|---|---|---|
| Steel bars, Pittsburgh | 2.15c | 2.15c | 2.15c | 2.15c |
| Steel bars, Chicago | 2.15 | 2.15 | 2.15 | 2.15 |
| Steel bars, Philadelphia | 2.49 | 2.49 | 2.49 | 2.47 |
| Shapes, Pittsburgh | 2.10 | 2.10 | 2.10 | 2.10 |
| Shapes, Philadelphia | 2.22 | 2.22 | 2.22 | 2.22 |
| Shapes, Chicago | 2.10 | 2.10 | 2.10 | 2.10 |
| Plates, Pittsburgh | 2.10 | 2.10 | 2.10 | 2.10 |
| Plates, Philadelphia | 2.15 | 2.15 | 2.15 | 2.15 |
| Plates, Chicago | 2.10 | 2.10 | 2.10 | 2.10 |
| Sheets, hot-rolled, Pittsburgh | 2.10 | 2.10 | 2.10 | 2.10 |
| Sheets, cold-rolled, Pittsburgh | 3.05 | 3.05 | 3.05 | 3.05 |
| Sheets, No. 24 galv., Pittsburgh | 3.50 | 3.50 | 3.50 | 3.50 |
| Sheets, hot-rolled, Gary | 2.10 | 2.10 | 2.10 | 2.10 |
| Sheets, cold-rolled, Gary | 3.05 | 3.05 | 3.05 | 3.05 |
| Sheets, No. 24 galv., Gary | 3.50 | 3.50 | 3.50 | 3.50 |
| Bright bess., basic wire, Pittsburgh | 2.60 | 2.60 | 2.60 | 2.60 |
| Tin plate, per base box, Pittsburgh | $5.00 | $5.00 | $5.00 | $5.00 |
| Wire nails, Pittsburgh | 2.55 | 2.55 | 2.55 | 2.55 |
| **Semifinished Material** | | | | |
| Sheet bars, Pittsburgh, Chicago | $34.00 | $34.00 | $34.00 | $34.00 |
| Slabs, Pittsburgh, Chicago | 34.00 | 34.00 | 34.00 | 34.00 |
| Rerolling billets, Pittsburgh | 34.00 | 34.00 | 34.00 | 34.00 |
| Wire rods No. 5 to $\frac{9}{32}$-inch, Pittsburgh | 2.00 | 2.00 | 2.00 | 2.00 |

| Pig Iron | Dec. 19, 1942 | Nov. 1942 | Sept. 1942 | Dec. 1941 |
|---|---|---|---|---|
| Bessemer, del. Pittsburgh | $25.19 | $25.19 | $25.19 | $25.34 |
| Basic, Valley | 23.50 | 23.50 | 23.50 | 23.50 |
| Basic, eastern, del. Philadelphia | 25.39 | 25.39 | 25.39 | 25.34 |
| No. 2 fdry., del. Pgh., N.&S. Sides | 24.69 | 24.69 | 24.69 | 24.69 |
| No. 2 foundry, Chicago | 24.00 | 24.00 | 24.00 | 24.00 |
| Southern No. 2 Birmingham | 20.38 | 20.38 | 20.38 | 20.38 |
| Southern No. 2, del. Cincinnati | 24.30 | 24.30 | 24.30 | 24.06 |
| No. 2X, del. Phila. (differ. av.) | 26.265 | 26.265 | 26.265 | 26.215 |
| Malleable, Valley | 24.00 | 24.00 | 24.00 | 24.00 |
| Malleable, Chicago | 24.00 | 24.00 | 24.00 | 24.00 |
| Lake Sup., charcoal, del. Chicago | 31.54 | 31.54 | 31.54 | 31.34 |
| Gray forge, del. Pittsburgh | 24.19 | 24.19 | 24.19 | 24.19 |
| Ferromanganese, del. Pittsburgh | 140.65 | 140.65 | 140.65 | 125.33 |
| **Scrap** | | | | |
| Heavy melting steel, Pitts. | $20.00 | $20.00 | $20.00 | $20.00 |
| Heavy melt. steel, No. 2, E. Pa. | 18.75 | 18.75 | 18.75 | 18.00 |
| Heavy melting steel, Chicago | 18.75 | 18.75 | 18.75 | 18.75 |
| Rails for rolling, Chicago | 22.25 | 22.25 | 22.25 | 22.25 |
| No. 1 cast, Chicago | 20.00 | 20.00 | 20.00 | 21.215 |
| **Coke** | | | | |
| Connellsville, furnace, ovens | $6.00 | $6.00 | $6.00 | $6.25 |
| Connellsville, foundry, ovens | 7.25 | 7.25 | 7.25 | 7.25 |
| Chicago, by-product fdry., del. | 12.25 | 12.25 | 12.25 | 12.25 |

## STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

### Semifinished Steel

**Gross ton basis except wire rods, skelp.**

**Carbon Steel Ingots:** F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

**Alloy Steel Ingots:** Pittsburgh base, uncropped, $45.00.

**Rerolling Billets, Slabs:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36.25; Duluth (bil.) $36.00.
(Wheeling Steel Corp. allocated 21,000 tons 2" square, base grade rerolling billets under lease-lend during first quarter 1942 at $37, f.o.b. Portsmouth, O.; Andrews Steel Co. may quote carbon steel slabs $41 gross ton at established basing points.)

**Forging Quality Billets:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.25; Duluth, $42.00.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points.)

**Open Hearth Shell Steel:** Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $52.00; 12-18 in., $54.00; 18 in. and over, $56.00.

**Alloy Billets, Slabs, Blooms:** Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

**Sheet Bars:** Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel sheet bars at $39 gross ton, f.o.b. mill.)

**Skelp:** Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., $1.90.

**Wire Rods:** Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., $2.00.
Do., over 9/32—47/64-in., incl., $2.15. Worcester add $0.10 Galveston, $0.27. Pacific Coast $0.50 on water shipment.

### Bars

**Hot-Rolled Carbon Bars:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.51c; Phila. del. 2.49c; Gulf Ports, dock 2.52c, all-rail 2.59c; Pac. ports, dock 2.50c; all rail 3.25c.
(Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points.) Joslyn Mfg. Co. may quote 2.35c, Chicago base. Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced on its 8-inch mill.)

**Rail Steel Bars:** Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

**Hot-Rolled Alloy Bars:** Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethhlehem, base 20 tons one size, 2.70c; Detroit, del., 2.82c.
(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

| AISI Series | (*Basic O-H) | AISI Series | (*Basic O-H) |
|---|---|---|---|
| 1300 | $0.10 | 4100 (.15-.25 Mo) | 0.55 |
| | | (.20-.30 Mo) | 0.60 |
| 2300 | 1.70 | 4340 | 1.70 |
| 2500 | 2.35 | 4600 | 1.20 |
| 3000 | 0.50 | 4800 | 2.15 |
| 3100 | 0.70 | 5100 | 0.35 |
| 3200 | 1.35 | 5130 or 5152 | 0.45 |
| 3400 | 3.20 | 6120 or 6152 | 0.95 |
| 4000 | 0.45-0.55 | 6145 or 6150 | 1.20 |

*Add 0.25 for acid open-hearth; 0.50 electric.

**Cold-Finished Carbon Bars:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.

**Cold-Finished Alloy Bars:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.47c.

**Turned, Ground Shafting:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

**Reinforcing Bars (New Billet):** Pittsburgh Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.27c.

**Reinforcing Bars (Rail Steel):** Pittsburgh Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

**Iron Bars:** Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

### Sheets, Strip

**Hot-Rolled Sheets:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.28c; New York del., 2.35c; Pacific ports 2.65c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

**Cold-Rolled Sheets:** Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.41c; Phila. del 3.39c; Pacific ports 3.70c.

**Galvanized Sheets, No. 24:** Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.68c; Pacific ports 4.05c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

**Corrugated Galv. Sheets:** Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

**Culvert Sheets:** Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

**Enameling Sheets:** Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage.

base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.

**Electrical Sheets, No. 24:**

| | Pittsburgh Base | Pacific Ports | Granite City |
|---|---|---|---|
| Field grade | 3.20c | 3.95c | 3.30c |
| Armature | 3.55c | 4.30c | 3.65c |
| Electrical | 4.05c | 4.80c | 4.15c |
| Motor | 4.95c | 5.70c | 5.05c |
| Dynamo | 5.65c | 6.40c | 5.75c |
| Transformer | | | |
| 72 | 6.15c | 6.90c | ..... |
| 65 | 7.15c | 7.90c | ..... |
| 58 | 7.65c | 8.40c | ..... |
| 52 | 8.45c | 9.20c | ..... |

**Hot-Rolled Strip:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.22c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

**Cold Rolled Strip:** Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.

**Commodity C. R. Strip:** Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.

**Cold-Finished Spring Steel:** Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

## Tin, Terne Plate

**Tin Plate:** Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

**Tin Mill Black Plate:** Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

**Long Ternes:** Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.

**Manufacturing Ternes: (Special Coated)** Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

**Roofing Ternes:** Pittsburgh base per package 112 sheets, 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

## Plates

**Carbon Steel Plates:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.30-2.55c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c. (Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill. Central Iron & Steel Co. may quote plates at 2.20c, f.o.b. basing points.)

**Floor Plates:** Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.

**Open-Hearth Alloy Plates:** Pittsburgh, Chicago, Coatesville, 3.50c.

**Wrought Iron Plates:** Pittsburgh, 3.80c.

## Shapes

**Structural shapes:** Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.28c; Phila., del., 2.22c; Gulf ports, 2.47c; Pacific ports, 2.75c. (Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points and 2.50c, Phoenixville, for export.)

**Steel Sheet Piling:** Pittsburgh, Chicago, Buffalo, 2.40c.

## Wire Products, Nails

**Wire:** Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

| | |
|---|---|
| Bright basic, bessemer wire | 2.60c |
| Galvanized wire | 2.60c |
| Spring wire | 3.20c |

**Wire Products to the Trade:**

| | |
|---|---|
| Standard and cement-coated wire nails, polished and staples, 100-lb. keg | $2.55 |
| Annealed fence wire, 100 lb. | 3.05 |
| Galvanized fence wire, 100 lb. | 3.40 |
| Woven fence, 12½ gage and lighter, per base column | .67 |
| Do., 11 gage and heavier | .70 |
| Barbed wire, 80-rod spool, col. | .70 |
| Twisted barbless wire, col. | .70 |
| Single loop bale ties, col. | .59 |
| Fence posts, carloads, col. | .69 |
| **Cut nails,** Pittsburgh, carloads | $3.85 |

## Pipe, Tubes

**Welded Pipe:** Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

| In. | Steel Blk. | Steel Galv. | In. | Iron Blk. | Iron Galv. |
|---|---|---|---|---|---|
| ⅛ | 56 | 33 | ½ | 24 | 3½ |
| ¼ & ⅜ | 59 | 40½ | ⅝ | 30 | 10 |
| ½ | 63½ | 51 | 1-1¼ | 34 | 16 |
| ¾ | 66½ | 55 | 1½ | 38 | 18½ |
| 1-3 | 68½ | 57½ | 2 | 37½ | 18 |

Lap Weld

| In. | Steel Blk. | Steel Galv. | In. | Iron Blk. | Iron Galv. |
|---|---|---|---|---|---|
| 2 | 61 | 49½ | 1¼ | 23 | 3½ |
| 2½-3 | 64 | 52½ | 1½ | 28½ | 10 |
| 3½-6 | 66 | 54½ | 2 | 30½ | 12 |
| 7-8 | 65 | 52½ | 2½, 3½ | 31½ | 14½ |
| 9-10 | 64½ | 52 | 4 | 33½ | 18 |
| 11-12 | 63½ | 51 | 4½-8 | 32½ | 17 |
| | | | 9-12 | 28½ | 12 |

**Boiler Tubes:** Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

| O. D. Sizes | B.W.G. | Seamless Hot Rolled | Seamless Cold Drawn | Lap Weld Steel | Lap Weld Charcoal Iron |
|---|---|---|---|---|---|
| 1" | 13 | $ 7.82 | $ 9.01 | ..... | ..... |
| 1¼" | 13 | 9.26 | 10.67 | ..... | ..... |
| 1½" | 13 | 10.23 | 11.72 | $ 9.72 | $23.71 |
| 1¾" | 13 | 11.64 | 13.42 | 11.06 | 22.93 |
| 2" | 13 | 13.04 | 15.03 | 12.38 | 19.35 |
| 2¼" | 13 | 14.54 | 16.76 | 13.79 | 21.63 |
| 2¼" | 12 | 16.01 | 18.45 | 15.16 | ..... |
| 2½" | 12 | 17.54 | 20.21 | 16.58 | 26.57 |
| 2¾" | 12 | 18.59 | 21.42 | 17.54 | 29.00 |
| 3" | 12 | 19.50 | 22.48 | 18.35 | 31.38 |
| 3½" | 11 | 24.63 | 28.37 | 23.15 | 39.81 |
| 4" | 10 | 30.54 | 35.20 | 28.66 | 49.90 |
| 4½" | 10 | 37.35 | 43.04 | 35.22 | ..... |
| 5" | 9 | 46.87 | 54.01 | 44.25 | 73.93 |
| 6" | 7 | 71.96 | 82.93 | 68.14 | ..... |

## Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $40.00.
Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.
*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.
Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

## Tool Steels

**Tool Steels:** Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

**High Speed Tool Steels:**

| Tung. | Chr. | Van. | Moly. | Pitts. base, per lb. |
|---|---|---|---|---|
| 18.00 | 4 | 1 | - | 67.00c |
| 18.00 | 4 | 2 | 1 | 77.00c |
| 18.00 | 4 | 3 | 1 | 87.00c |
| 1.5 | 4 | 1 | 8.5 | 54.00c |
| | 4 | 2 | 8 | 54.00c |
| 5.50 | 4 | 1.50 | 4 | 57.50c |
| 5.50 | 4.50 | 4 | 4.50 | 70.00c |

## Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

| Type | Bars | Plates | Sheets | H. R. Strip | C. R. Strip |
|---|---|---|---|---|---|
| **CHROMIUM NICKEL STEEL** | | | | | |
| 302 | 24.00c | 27.00c | 34.00c | 21.50c | 28.00c |
| 303 | 26.00 | 29.00 | 36.00 | 27.00 | 33.00 |
| 304 | 25.00 | 29.00 | 36.00 | 23.50 | 30.00 |
| 308 | 29.00 | 34.00 | 41.00 | 28.50 | 35.00 |
| 309 | 36.00 | 40.00 | 47.00 | 37.00 | 47.00 |
| 310 | 49.00 | 52.00 | 53.00 | 48.75 | 56.00 |
| 311 | 49.00 | 52.00 | 53.00 | 48.75 | 56.00 |
| 312 | 36.00 | 40.00 | 49.00 | ..... | ..... |
| *316 | 40.00 | 44.00 | 48.00 | 40.00 | 48.00 |
| *317 | 50.00 | 54.00 | 58.00 | 50.00 | 58.00 |
| †321 | 29.00 | 34.00 | 41.00 | 29.25 | 38.00 |
| ‡347 | 33.00 | 38.00 | 45.00 | 33.00 | 42.00 |
| 431 | 19.00 | 22.00 | 29.00 | 17.50 | 22.50 |
| **STRAIGHT CHROMIUM STEEL** | | | | | |
| 403 | 21.50 | 24.50 | 29.50 | 21.25 | 27.00 |
| **410 | 18.50 | 21.50 | 26.50 | 17.00 | 22.00 |
| 416 | 19.00 | 22.00 | 27.00 | 18.25 | 23.50 |
| ††420 | 24.00 | 28.50 | 33.50 | 23.75 | 36.50 |
| 430 | 19.00 | 22.00 | 29.00 | 17.50 | 22.50 |
| ‡‡430F | 19.50 | 22.50 | 29.50 | 18.75 | 24.50 |
| 442 | 22.50 | 25.50 | 32.50 | 24.00 | 32.00 |
| 446 | 27.50 | 30.50 | 36.50 | 35.00 | 52.00 |
| 501 | 8.00 | 12.00 | 15.75 | 12.00 | 17.00 |
| 502 | 9.00 | 13.00 | 16.75 | 13.00 | 16.00 |
| **STAINLESS CLAD STEEL (20%)** | | | | | |
| 304 | ..... | §§18.00 | 19.00 | ..... | ..... |

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

**Basing Point Prices** are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

**Extras** mean additions or deductions from base prices in effect April 16, 1941.

**Delivered prices** applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.

**Domestic Ceiling prices** are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin.

**Seconds,** maximum prices: flat-rolled rejects 75% of prime prices; wasters 75%, waste-wusters 65%, except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

**Export ceiling prices** may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

## Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

**Carriage and Machine**

| | |
|---|---|
| ½ x 6 and smaller | 63½ off |
| Do., ⅞ and ⅝ x 6-in. and shorter | 63½ off |
| Do., ¾ to 1 x 6-in. and shorter | 61 off |
| 1⅛ and larger, all lengths | 59 off |
| All diameters, over 6-in. long | 59 off |
| Tire bolts | 50 off |
| Step bolts | 56 off |
| Plow bolts | 65 off |

**Stove Bolts**

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

**Nuts**

| Semifinished hex. | U.S.S. | S.A.E. |
|---|---|---|
| ⅞-inch and less | 62 | 64 |
| 1-1-inch | 59 | 60 |
| 1⅛-1½-inch | 57 | 58 |
| 1⅝ and larger | 56 | .. |

**Hexagon Cap Screws**

| | |
|---|---|
| Upset 1-in., smaller | 64 off |
| Milled 1-in., smaller | 60 off |

**Square Head Set Screws**

| | |
|---|---|
| Upset, 1-in., smaller | 71 off |
| Headless, ¼-in., larger | 60 off |
| No. 10, smaller | 70 off |

## Piling

Pittsburgh, Chicago, Buffalo ..... 2.40c

## Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

| | |
|---|---|
| Structural | 3.75c |
| ⅞-inch and under | 65-5 off |
| Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l. | $2.75-3.00 off |

## Metallurgical Coke

Price Per Net Ton

**Beehive Ovens**

| | |
|---|---|
| Connellsville, furnace | *$6.00 |
| Connellsville, foundry | 7.00- 7.50 |
| Connellsville prem. fdry. | 7.25- 7.60 |
| New River, foundry | 8.00- 8.25 |
| Wise county, foundry | 7.50 |
| Wise county, furnace | 6.50 |
| **By-Product Foundry** | |
| Kearny, N. J., ovens | 12.15 |
| Chicago, outside delivered | 11.50 |
| Chicago, delivered | 12.25 |
| Terre Haute, delivered | 12.00 |
| Milwaukee, ovens | 12.25 |
| New England, delivered | 13.75 |
| St. Louis, delivered | †12.25 |
| Birmingham, ovens | 8.50 |
| Indianapolis, delivered | 12.00 |
| Cincinnati, delivered | 11.75 |
| Cleveland, delivered | 12.30 |
| Buffalo, delivered | 12.50 |
| Detroit, delivered | 12.25 |
| Philadelphia, delivered | 12.38 |

*Operators of hand-drawn ovens using trucked coal may charge $6.50, effective Aug. 12, 1942. †$12.75 from other than Ala., Mo., Tenn.

## Coke By-Products

Spot, gal., freight allowed east of Omaha

| | |
|---|---|
| Pure and 90% benzol | 15.00c |
| Toluol, two degree | 28.00c |
| Solvent naphtha | 27.00c |
| Industrial xylol | 27.00c |
| Per lb. f.o.b. works | |
| Phenol (car lots, returnable drums) | 12.50c |
| Do. less than car lots | 13.25c |
| Do. tank cars | 11.50c |
| Eastern Plants, per lb. | |
| Naphthalene flakes, balls, bbls., to jobbers | 8.00c |
| Per ton, bulk, f.o.b. port | |
| Sulphate of ammonia | $29.20 |

## Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

| | No. 2 Foundry | Basic | Bessemer | Malleable |
|---|---|---|---|---|
| **Bethlehem, Pa., base** | $25.00 | $24.50 | $26.00 | $25.50 |
| Newark, N. J., del. | 26.62 | 26.12 | 27.62 | 27.12 |
| Brooklyn, N. Y., del. | 27.65 | ..... | ..... | 28.15 |
| **Birdsboro, Pa., del.** | 25.00 | 24.50 | 26.00 | 25.50 |
| **Birmingham, base** | †20.38 | †19.00 | ..... | ..... |
| Baltimore, del. | 25.67 | ..... | ..... | ..... |
| Boston, del. | 25.12 | ..... | ..... | ..... |
| Chicago, del. | ‡24.47 | ..... | ..... | ..... |
| Cincinnati, del. | 24.30 | 22.92 | ..... | ..... |
| Cleveland, del. | 24.12 | 23.24 | ..... | ..... |
| Newark, N. J., del. | 26.24 | ..... | ..... | ..... |
| Philadelphia, del. | 25.51 | 25.01 | ..... | ..... |
| St. Louis, del. | ‡24.12 | 23.24 | ..... | ..... |
| **Buffalo, base** | 24.00 | 23.00 | 25.00 | 24.50 |
| Boston, del. | 25.50 | 25.00 | 26.50 | 26.00 |
| Rochester, del. | 25.53 | ..... | 26.58 | 26.08 |
| Syracuse, del. | 26.08 | ..... | 27.08 | 26.58 |
| **Chicago, base** | 24.00 | 23.50 | 24.50 | 24.00 |
| Milwaukee, del. | 25.17 | 24.67 | 25.67 | 25.17 |
| Muskegon, Mich., del. | 27.38 | ..... | ..... | 27.38 |
| **Cleveland, base** | 24.00 | 23.50 | 24.50 | 24.00 |
| Akron, Canton, O., del. | 25.47 | 24.97 | 25.97 | 25.47 |
| **Detroit, base** | 24.00 | 23.50 | 24.50 | 24.00 |
| Saginaw, Mich., del. | 26.45 | 25.95 | 26.95 | 26.45 |
| **Duluth, base** | 24.50 | 24.00 | 25.00 | 24.50 |
| St. Paul, del. | 26.76 | 26.26 | 27.26 | 26.76 |
| **Erie, Pa., base** | 24.00 | 23.50 | 25.00 | 24.50 |
| **Everett, Mass., base** | 25.00 | 24.50 | 26.00 | 25.50 |
| Boston | 25.50 | 25.00 | 26.50 | 26.00 |
| **Granite City, Ill., base** | 24.00 | 23.50 | 24.50 | 24.00 |
| St. Louis, del. | 24.50 | 24.00 | ..... | 24.50 |
| **Hamilton, O., base** | 24.00 | 23.50 | ..... | 24.00 |
| Cincinnati, del. | 24.68 | 24.68 | ..... | 25.35 |
| **Neville Island, Pa., base** | 24.00 | 23.50 | 24.50 | 24.00 |
| ‡Pittsburgh, del., No. & So. sides | 24.69 | 24.19 | 25.19 | 24.69 |
| **Provo, Utah, base** | 22.00 | ..... | ..... | ..... |
| **Sharpsville, Pa., base** | 24.00 | 23.50 | 24.50 | 24.00 |
| **Sparrows Point, Md., base** | 25.00 | 24.50 | ..... | ..... |
| Baltimore, del. | 26.05 | ..... | ..... | ..... |
| **Steelton, Pa., base** | ..... | 24.50 | ..... | 25.50 |
| **Swedeland, Pa., base** | 25.00 | 24.50 | 26.00 | 25.50 |
| Philadelphia, del. | 25.89 | 25.39 | ..... | 26.39 |
| **Toledo, O., base** | 24.00 | 23.50 | 24.50 | 24.00 |
| Mansfield, O., del. | 26.06 | 25.56 | 26.56 | 26.06 |
| **Youngstown, O., base** | 24.00 | 23.50 | 24.50 | 24.00 |

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. ‖For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

**High Silicon, Silvery**

6.00-6.50 per cent (base).....$29.50
6.51-7.00..$30.50 9.01- 9.50..$35.50
7.01-7.50.. 31.50 9.51-10.00.. 36.50
7.51-8.00.. 32.50 10.01-10.50.. 37.50
8.01-8.50.. 33.50 10.51-11.00.. 38.50
8.51-9.00.. 34.50 11.01-11.50.. 39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

**Bessemer Ferrosilicon**

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling irons, Nos. 5 and 6.)

**Charcoal Pig Iron**

Northern

Lake Superior Furn. .....$28.00
Chicago, del. ..... 31.54

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn..$28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn.. 33.00

**Gray Forge**

Neville Island, Pa. .....$23.50
Valley, base ..... 23.50

**Low Phosphorus**

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.81, delivered, Philadelphia.

**Switching Charges:** Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

**Silicon Differentials:** Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

**Phosphorous Differential:** Basing point prices are subject to a reduction of 38 cents a ton for phosphorous content of 0.70% and over.

**Manganese Differentials:** Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

**Ceiling prices** are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

**Exceptions to Ceiling Prices:** Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

**Refractories**

## Refractories

| Per 1000 f.o.b. Works, Net Prices | |
|---|---|
| **Fire Clay Brick** | |
| Super Quality | |
| Pa., Mo., Ky. | $64.60 |
| First Quality | |
| Pa., Ill., Md., Mo., Ky. | 51.36 |
| Alabama, Georgia | 51.30 |
| New Jersey | 56.00 |
| Ohio | 43.00 |
| Second Quality | |
| Pa., Ill., Md., Mo., Ky. | 46.55 |
| Alabama, Georgia | 38.00 |
| New Jersey | 49.00 |
| Ohio | 36.00 |
| **Malleable Bung Brick** | |
| All bases | $59.85 |
| **Silica Brick** | |
| Pennsylvania | $51.30 |
| Joliet, E. Chicago | 58.90 |
| Birmingham, Ala. | 51.30 |
| **Ladle Brick** (Pa., O., W. Va., Mo.) | |
| Dry press | $31.00 |
| Wire cut | 29.00 |
| **Magnesite** | |
| Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk | 22.00 |
| net ton, bags | 26.00 |
| **Basic Brick** | |
| Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa. | |
| Chrome brick | $54.00 |
| Chem. bonded chrome | 54.00 |
| Magnesite brick | 76.00 |
| Chem. bonded magnesite | 65.00 |
| Fluorspar | |

## Fluorspar

Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail .....$25.00-28.00
Do., barge ..... 25.00-28.00
No. 2 lump ..... 25.00-28.00

(Prices effective Nov. 23, 1942)

## Ferroalloy Prices

**Ferromanganese:** 78-82%, carlots, gross ton, duty paid, Atlantic ports, $135; Del. Pittsburgh $140.65; f.o.b. Southern furnaces $135; Add $6 per gross ton for packed carloads $10 for ton, $13.50 for less-ton and $18 for less than 200-lb. lots, packed.

**Spiegeleisen:** 19-21%, carlots per gross ton, Palmerton, Pa. $36.

**Electrolytic manganese:** 99.9% plus, less ton lots, per lb. 42.00c. Ton lots 40.00c. Annual contracts 38.00c.

**Chromium Metal:** Per lb. contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

**Ferrocolumbium:** 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

**Ferrochrome:** 66-70%; per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

| | Car loads | Ton lots | Less ton | Less 200 lbs. |
|---|---|---|---|---|
| 2% C. | 19.50c | 20.25c | 20.75c | 21.00c |
| 1% C. | 20.50c | 21.25c | 21.75c | 22.00c |
| 0.20% C. | 21.50c | 22.25c | 22.75c | 23.00c |
| 0.10% C. | 22.50c | 23.25c | 23.75c | 24.00c |

Spot is ¼c higher

**Chromium briquets:** Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

**Ferromolybdenum:** 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

**Calcium Molybdate (Molyte):** 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

**Molybdic Oxide Briquets:** 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

**Molybdenum Oxide:** 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

**Molybdenum Powder:** 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

**Ferrophosphorus:** 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

**Ferrophosphorus:** 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

**Ferrosilicon:** Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

| | Carloads | Ton lots |
|---|---|---|
| 50% | $ 74.50 | $ 87.00 |
| Unitage | 1.50 | 1.75 |
| 75% | 135.00 | 151.00 |
| Unitage | 1.80 | 2.00 |
| 85% | 170.00 | 188.00 |
| Unitage | 2.00 | 2.20 |
| 90-95% | 10.25c | 11.25c |

Spot prices ¼-cent higher.

**Silicon Metal:** Contract basis per lb., f.o.b. producers' plants, freight allowed; 1% iron; carlots 14.50c, ton lots 15.00c, less-ton lots 15.25c, less 200 lbs. 15.50c.

**Silicon Metal:** Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

**Silicon Briquets:** Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

**Silicomanganese:** Contract basis freight allowed, 1½% carbon; in carloads per gross ton $135; ton lots $147.50. Spot $5 per ton higher.

**Silico-manganese Briquets:** Contract basis in carloads per pound, bulk freight allowed 5.80c; packed 6.05c; ton lots 6.30c; less-ton lots 6.55c; less 200-lb. lots 6.80c. Spot prices ¼-cent higher.

**Ferrotungsten:** Carlots, per lb. contained tungsten, $1.90.

**Tungsten Metal Powder:** 98-99%, per lb. any quantity $2.55-2.65.

**Ferrotitanium:** 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot 5 cents per lb. higher.

**Ferrotitanium:** 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

**High-Carbon Ferrotitanium:** 15-20%, Contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

**Ferrovanadium:** 35-40%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

**Vanadium Pentoxide:** Technical grade, 88-92 per cent $V_2O_5$; contracts, any quantity, $1.10 per pound $V_2O_5$ contained; spot 5 cents per pound higher.

**Zirconium Alloys:** 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

**Zirconium alloy:** 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

**Alsifer:** (Approx. 20% aluminum, 40% silicon, 40% iron) Contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ¼-cent higher.

**Simanal:** (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 10.50c; ton lots 11.00c, less ton lots, 11.50c.

# WAREHOUSE STEEL PRICES

*Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials. As of April 16, 1941*

| | Soft Bars | Hot-Rolled Strip Bands | Hot-Rolled Strip Hoops | Plates ¼-in. & Over | Structural Shapes | Floor Plates | Sheets Hot Rolled | Sheets Cold Rolled | Sheets Galv. No. 24 | Cold Rolled Strip | Cold Drawn Bars Carbon | Cold Drawn Bars S.A.E. 2300 | Cold Drawn Bars S.A.E. 3100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Boston | 3.98 | 4.06 | 5.06 | 3.85 | 3.85 | 5.66 | 3.71 | 4.68 | 5.11 | 3.46 | 4.13 | 8.88 | 7.23 |
| New York (Met.) | 3.84 | 3.96 | 3.96 | 3.76 | 3.75 | 5.56 | 3.58 | 4.60 | 5.00 | 3.51 | 4.09 | 8.84 | 7.19 |
| Philadelphia | 3.85 | 3.95 | 4.45 | 3.55 | 3.55 | 5.25 | 3.55 | 4.05 | 4.65 | 3.31 | 4.06 | 8.56 | 7.16 |
| Baltimore | 3.85 | 4.00 | 4.35 | 3.70 | 3.70 | 5.25 | 3.50 | .... | 5.05 | .... | 4.04 | .... | .... |
| Norfolk, Va. | 4.00 | 4.10 | .... | 4.05 | 4.05 | 5.45 | 3.85 | .... | 5.40 | .... | 4.15 | .... | .... |
| Buffalo | 3.35 | 3.82 | 3.82 | 3.62 | 3.40 | 5.25 | 3.25 | 4.30 | 4.75 | 3.52 | 3.75 | 8.40 | 6.75 |
| Washington, D. C. | 3.95 | 4.10 | 4.45 | 3.80 | 3.80 | 5.35 | 3.60 | .... | .... | .... | 4.03 | .... | .... |
| Pittsburgh | 3.35 | 3.60 | 3.60 | 3.40 | 3.40 | 5.00 | 3.35 | .... | 4.65 | .... | 3.65 | 8.40 | 6.75 |
| Cleveland | 3.25 | 3.50 | 3.50 | 3.40 | 3.58 | 5.18 | 3.35 | 4.05 | 4.62 | 3.20 | 3.75 | 8.40 | 6.75 |
| Detroit | 3.43 | 3.43 | 3.68 | 3.60 | 3.65 | 5.27 | 3.43 | 4.30 | 4.84 | 3.40 | 3.80 | 8.70 | 7.05 |
| Omaha | 4.10 | 4.20 | 4.20 | 4.15 | 4.15 | 5.75 | 3.85 | 5.32 | 5.50 | .... | 4.42 | .... | .... |
| Cincinnati | 3.60 | 3.67 | 3.67 | 3.65 | 3.68 | 5.28 | 3.42 | 4.37 | 4.92 | 3.45 | 4.00 | 8.75 | 7.10 |
| Chicago | 3.50 | 3.60 | 3.60 | 3.55 | 3.56 | 5.15 | 3.25 | 4.10 | 4.85 | 3.50 | 3.75 | 8.40 | 6.75 |
| Twin Cities | 3.75 | 3.85 | 3.85 | 3.80 | 3.80 | 5.40 | 3.50 | 4.35 | 5.00 | 3.83 | 4.34 | 9.09 | 7.44 |
| Milwaukee | 3.63 | 3.53 | 3.53 | 3.68 | 3.68 | 5.28 | 3.38 | 4.23 | 4.98 | 3.54 | 3.88 | 8.38 | 6.98 |
| St. Louis | 3.64 | 3.74 | 3.74 | 3.69 | 3.69 | 5.29 | 3.39 | 4.24 | 4.99 | 3.61 | 4.02 | 8.77 | 7.12 |
| Indianapolis | 3.60 | 3.75 | 3.75 | 3.70 | 3.70 | 5.30 | 3.45 | .... | 5.01 | .... | 3.97 | .... | .... |
| Chattanooga* | 3.80 | 4.00 | 4.00 | 3.85 | 3.85 | 5.80 | 3.75 | .... | 4.50 | .... | 4.39 | .... | .... |
| Memphis | 3.90 | 4.10 | 4.10 | 3.95 | 3.95 | 5.71 | 3.85 | .... | 5.25 | .... | 4.31 | .... | .... |
| Birmingham | 3.50 | 3.70 | 3.70 | 3.55 | 3.55 | 5.90 | 3.45 | .... | 4.75 | .... | 4.43 | .... | .... |
| New Orleans | 4.00 | 4.10 | 4.10 | 3.80 | 3.80 | 5.75 | 3.85 | .... | 5.25 | 5.00 | 4.60 | .... | .... |
| Houston, Tex. | 3.75 | 4.30 | 4.30 | 4.05 | 4.05 | 5.50 | 4.00 | .... | 5.25 | .... | 6.90 | .... | .... |
| Seattle | 4.20 | 4.25 | 5.45 | 4.75 | 4.45 | 6.50 | 4.65 | 7.60 | 5.70 | .... | 5.75 | .... | .... |
| Los Angeles | 4.35 | 4.90 | 6.70 | 4.90 | 4.60 | 7.15 | 4.95 | 7.15 | 5.95 | .... | 6.10 | 10.35 | 9.55 |
| San Francisco | 3.95 | 4.50 | 6.25 | 4.65 | 4.35 | 6.35 | 4.55 | 6.40 | 6.10 | .... | 6.80 | 10.80 | 9.80 |

*Not named in OPA price order.

| | S.A.E. Hot-rolled Bars (Unannealed) 1035-1050 | 2300 Series | 3100 Series | 4100 Series | 6100 Series |
|---|---|---|---|---|---|
| Boston | 4.28 | 7.75 | 6.05 | 5.80 | 7.90 |
| New York (Met.) | 4.04 | 7.60 | 5.90 | 5.65 | .... |
| Philadelphia | 4.10 | 7.56 | 5.86 | 5.61 | 8.56 |
| Baltimore | 4.45 | .... | .... | .... | .... |
| Buffalo | 3.55 | 7.35 | 5.65 | 5.40 | 7.50 |
| Pittsburgh | 3.40 | 7.45 | 5.75 | 5.50 | 7.60 |
| Cleveland | 3.30 | 7.55 | 5.85 | 5.85 | 7.70 |
| Detroit | 3.48 | 7.67 | 5.97 | 5.72 | 7.19 |
| Cincinnati | 3.65 | 7.69 | 5.90 | 5.74 | 7.84 |
| Chicago | 3.70 | 7.35 | 5.65 | 5.40 | 7.50 |
| Twin Cities | 3.95 | 7.70 | 6.00 | 6.09 | 8.19 |
| Milwaukee | 3.83 | 7.33 | 5.88 | 5.63 | 7.73 |
| St. Louis | 3.84 | 7.72 | 6.02 | 5.77 | 7.87 |
| Seattle | 6.25 | .... | 8.00 | 7.85 | 8.65 |
| Los Angeles | 4.60 | 9.55 | 8.55 | 8.40 | 8.90 |
| San Francisco | 5.45 | 9.80 | 8.80 | 8.65 | 9.05 |

**BASE QUANTITIES**

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland; 300-9999 Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham, Memphis.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Omaha, Kansas City, St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities, New Orleans; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-10,000 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco; 1 to 99, Los Angeles; 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

## Ores

**Lake Superior Iron Ore**

*Gross ton, 51½%*

*Lower Lake Ports*

| | |
|---|---|
| Old range bessemer | $4.75 |
| Mesabi nonbessemer | 4.45 |
| High phosphorus | 4.35 |
| Mesabi bessemer | 4.60 |
| Old range nonbessemer | 4.60 |

**Eastern Local Ore**

*Cents, unit, del. E. Pa.*

| | |
|---|---|
| Foundry and basic 56-63%, contract | 13.00 |

**Foreign Ore**

*Cents per unit, c.i.f. Atlantic ports*

| | |
|---|---|
| Manganiferous ore, 45-55% Fe., 6-10% Mang. | Nom |
| N. African low phos. | Nom. |
| Spanish, No. African basic, 50 to 60% | Nom. |
| Brazil iron ore, 68-69% f.o.b. Rio de Janeiro | 7.50-8.00c |

**Tungsten Ore**

| | |
|---|---|
| Chinese wolframite, per short ton unit, duty paid | $34.00 |

**Chrome Ore**

(Equivalent OPA schedules):

*Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.*

*($/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)*

| | |
|---|---|
| Indian and African | |
| 48% 2.8:1 | 41.00 |
| 48% 3:1 | 43.50 |
| 48% no ratio | 31.00 |
| South African (Transvaal) | |
| 44% no ratio | 27.40 |
| 45% no ratio | 28.30 |
| 48% no ratio | 31.00 |
| 50% no ratio | 32.80 |
| Brazilian—nominal | |
| 44% 2.5:1 lump | 33.05 |
| 48% 3:1 lump | 43.50 |
| Rhodesian | |
| 45% no ratio | 28.30 |
| 48% no ratio | 31.00 |
| 48% 3:1 lump | 43.50 |
| Domestic (f.o.b. Columbus, Mont.) | |
| 48% 3:1 | 48.50 |
| less $7 freight allowance | |

**Manganese Ore**

*Including war risk but not duty, cents per gross-ton unit, dry, f.o.b. cars, New Orleans and Mobile; 5 cents higher at Norfolk, Baltimore, Philadelphia, New York; adjustments for analysis variations. (Based on OPA schedules.)*

| | |
|---|---|
| Brazilian, 48% | 73.9c |
| Brazilian, 46% | 71.8c |
| Caucasian, 51% | 75.3c |
| Caucasian, 50% | 74.8c |
| Chilean, 48% | 73.8c |
| Indian, 50% | 74.8c |
| Indian, 48% | 73.8c |
| South African, 48% | 73.8c |
| South African, 46% | 71.8c |
| (Duty Free) | |
| Cuban, 51% | 86.5c |
| Cuban, 48% | 85.0c |
| Cuban, 45% | 82.0c |
| Philippine, 50% | 85.0c |
| Domestic, 48%, f.o.b. mines | 96.0c |

**Molybdenum**

| | |
|---|---|
| Sulphide conc., lb., Mo. cont., mines | $0.75 |

## NATIONAL EMERGENCY STEELS (Hot Rolled)

*Extras for Alloy Content*

| Designation | Carbon | Mn. | Si. | Cr. | Ni. | Mo. | Basic open-hearth Bars per 100 lb. | Basic open-hearth Billets per G T | Electric furnace Bars per 100 lb. | Electric furnace Billets per G T |
|---|---|---|---|---|---|---|---|---|---|---|
| NE 1330 | .28-.33 | 1.60-1.90 | .20-.35 | ..... | ..... | ..... | $ .10 | $2.00 | .... | ..... |
| NE 8020 | .18-.23 | 1.00-1.30 | .20-.35 | ..... | ..... | .10-.20 | .45 | 9.00 | $.95 | $19.00 |
| NE 8339 | .35-.42 | 1.30-1.60 | .20-.35 | ..... | ..... | .20-.30 | .75 | 15.00 | 1.25 | 25.00 |
| NE 8442 | .40-.45 | 1.30-1.60 | .20-.35 | ..... | ..... | .30-.40 | .90 | 18.00 | 1.40 | 28.00 |
| NE 8613 | .12-.17 | .70- .90 | .20-.35 | .40-.60 | .40-.60 | .15-.25 | .75 | 15.00 | 1.25 | 25.00 |
| NE 8715 | .13-.18 | .70- .90 | .20-.35 | .40-.60 | .40-.60 | .20-.30 | .80 | 16.00 | 1.30 | 26.00 |
| NE 8949 | .45-.50 | 1.00-1.30 | .20-.35 | .40-.60 | .40-.60 | .30-.40 | 1.20 | 24.00 | 1.70 | 34.00 |
| NE 9255 | .50-.60 | .75-1.00 | 1.80-2.20 | ..... | ..... | ..... | .40 | 8.00 | .... | ..... |
| NE 9262 | .55-.65 | .75-1.00 | 1.80-2.20 | .20-.40 | ..... | ..... | .65 | 13.00 | .... | ..... |
| NE 9415 | .13-.18 | .80-1.10 | .40-.60 | .20-.40 | .20-.40 | .08-.15 | .80 | 16.00 | 1.30 | 26.00 |
| NE 9442 | .40-.45 | 1.00-1.30 | .40-.60 | .20-.40 | .20-.40 | .08-.15 | .85 | 17.00 | 1.35 | 27.00 |
| NE 9537 | .35-.40 | 1.20-1.50 | .40-.60 | .40-.60 | .40-.60 | .15-.25 | 1.20 | 24.00 | 1.70 | 34.00 |
| NE 9630 | .28-.33 | 1.20-1.50 | .40-.60 | .40-.60 | ..... | ..... | .80 | 16.00 | 1.30 | 26.00 |
| NE 9642 | .40-.45 | 1.30-1.60 | .40-.60 | .40-.60 | ..... | ..... | .85 | 17.00 | 1.35 | 27.00 |

Chemical Composition Limits, Per Cent

Extras are in addition to a base price of 2.70c, per 100 lb., on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semifinished. No prices quoted on vanadium alloy.

# MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

## PRICES FOR OTHER THAN RAILROAD SCRAP

| | OPEN HEARTH GRADES* | Machine Shop Turnings | BLAST FURNACE GRADES* | ELECTRIC FURNACE AND FOUNDRY GRADES | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Low Phos. Grades Billet, Bloom Forge Crops | Bar Crops and smaller; Punchings, Plate | Heavy Structural, Plate 3 ft. and less | 2 ft. and less | 1 ft. and less | Cut Auto Scrap 3 ft. and less | 2 ft. and less | 1 ft. and less | Alloy-Free Low Phos. & Sulphur Turnings | First Cut Heavy Axle & Forge Turnings | Electric Furnace Bundles |
| Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren | $20.00 | $16.00 | $16.00 | $25.00 | $22.50 | $21.00 | $21.50 | $22.00 | $20.00 | $20.50 | $21.00 | $18.00 | $19.50 | $21.00 |
| Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville | 18.75 | 14.75 | 14.75 | 23.75 | 21.25 | 19.75 | 20.25 | 20.75 | 18.75 | 19.25 | 19.75 | 16.75 | 18.25 | 19.75 |
| Bethlehem | 18.25 | 14.25 | 14.25 | 23.25 | 20.75 | 19.25 | 19.75 | 20.25 | 18.25 | 18.75 | 19.25 | 16.25 | 17.75 | 19.25 |
| Buffalo | 19.25 | 15.25 | 15.25 | 24.25 | 21.75 | 20.25 | 20.75 | 21.25 | 19.25 | 19.75 | 20.25 | 17.25 | 18.75 | 20.25 |
| Cleveland, Middletown, Cincinnati, Portsmouth, Ashland | 19.50 | 15.50 | 15.50 | 24.50 | 22.00 | 20.50 | 21.00 | 21.50 | 19.50 | 20.00 | 20.50 | 17.50 | 19.00 | 20.50 |
| Detroit | 17.85 | 13.85 | 13.85 | 22.85 | 20.35 | 18.85 | 19.35 | 19.85 | 17.85 | 18.35 | 18.85 | 15.85 | 17.35 | 18.85 |
| Toledo | . . | 13.85 | 13.85 | . . | . | . . | . . | . . | . . | . . | . . | . . | . . | . . |
| Chicago | 18.75 | 14.75 | 14.75 | 23.75 | 21.25 | 19.75 | 20.25 | 20.75 | 18.75 | 19.25 | 19.75 | 16.75 | 18.25 | 19.75 |
| Kokomo | 18.25 | 14.25 | 14.25 | 23.25 | 20.75 | 19.25 | 19.75 | 20.25 | 18.25 | 18.75 | 19.25 | 16.25 | 17.75 | 19.25 |
| Duluth | 18.00 | 14.00 | 14.00 | 23.00 | 20.50 | 19.00 | 19.50 | 20.00 | 18.00 | 18.50 | 19.00 | 16.00 | 17.50 | 19.00 |
| St. Louis | 17.50 | 13.50 | 13.50 | 22.50 | 20.00 | 18.50 | 19.00 | 19.50 | 17.50 | 18.00 | 18.50 | 15.50 | 17.00 | 18.50 |
| Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif. | 17.00 | 13.00 | 13.00 | 22.00 | 19.50 | 18.00 | 18.50 | 19.00 | 17.00 | 17.50 | 18.00 | 15.00 | 16.50 | 18.00 |
| Minnequa, Colo. | 16.50 | 12.50 | 12.50 | 21.50 | 19.00 | 17.50 | 18.00 | 18.50 | 16.50 | 17.00 | 17.50 | 14.50 | 16.00 | 17.50 |
| Seattle | 14.50 | 10.50 | 10.50 | 19.50 | 17.00 | 15.50 | 16.00 | 16.50 | 14.50 | 15.00 | 15.50 | 12.50 | 14.00 | 15.50 |

## RAILROAD SCRAP

| | Heavy Melting Steel | Scrap Rails | Rails for Rolling | Scrap Rails 3 ft. and under | Scrap Rails 2 ft. and under | Scrap Rails 18 in. and under |
|---|---|---|---|---|---|---|
| Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton | $21.00 | $22.00 | $23.50 | $24.00 | $24.25 | $24.50 |
| Philadelphia, Wilmington, Sparrows Point | 19.75 | 20.75 | 22.25 | 22.75 | 23.00 | 23.25 |
| Cleveland, Cincinnati, Middletown, Ashland, Portsmouth | 20.50 | 21.50 | 23.00 | 23.50 | 23.75 | 24.00 |
| Chicago | 19.75 | 20.75 | 22.25 | 22.75 | 23.00 | 23.25 |
| Buffalo | 20.25 | 21.25 | 22.75 | 23.25 | 23.50 | 23.75 |
| Detroit | 18.85 | 19.85 | 21.35 | 21.85 | 22.10 | 22.35 |
| Kokomo | 19.25 | 20.25 | 21.75 | 22.25 | 22.50 | 22.75 |
| Duluth | 19.00 | 20.00 | 21.50 | 22.00 | 22.25 | 22.50 |
| Kansas City, Mo. | 17.00 | 18.00 | 19.50 | 20.00 | 20.25 | 20.50 |
| St. Louis | 18.50 | 19.50 | 21.00 | 21.50 | 21.75 | 22.00 |
| Birmingham | 18.00 | 19.00 | 20.50 | 21.00 | 21.25 | 21.50 |
| Los Angeles, San Francisco | 18.00 | 19.00 | 20.50 | 21.00 | 21.25 | 21.50 |
| Seattle | 15.50 | 16.50 | 18.00 | 18.50 | 18.75 | 19.00 |

## CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

| | Group A | Group B | Group C |
|---|---|---|---|
| No. 1 Cupola Cast | $18.00 | $19.00 | $20.00 |
| No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under | 18.00 | 19.00 | 20.00 |
| Clean Auto Cast | 18.00 | 19.00 | 20.00 |
| Stove Plate | 17.00 | 18.00 | 19.00 |
| Unstripped Motor Blocks | 17.50 | 18.50 | 19.50 |
| Heavy Breakable Cast | 15.50 | 16.50 | 17.50 |
| Charging Box Size Cast | 17.00 | 18.00 | 19.00 |
| Miscellaneous Malleable | 20.00 | 21.00 | 22.00 |

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

***Open Hearth Grades** refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, No. 2 busheling, $2.50 under No. 1 heavy melting steel, auto springs, crankshafts, $1 over No. 1 heavy melting. **Blast Furnace Grades** prices refer to mixed borings and turnings, shoveling turnings, and cast iron borings.

**A basing point** includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

**Inferior Grades:** Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

**Commissions:** No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

**Maximum Shipping Point Price:** Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

**Maximum Delivered Prices:** Determined by adding established transportation charges to shipping point price, not to exceed by more than $3 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

**Unprepared Scrap:** Above prices are for prepared scrap. Maximum prices for unprepared scrap are $2.50 less (railroad grades $3.50 less; material from which Nos. 1, 2 and 3 bundles made is $4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grades of prepared scrap." Graveyard autos not considered unprepared scrap.

**Remote Scrap:** Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

## Sheets, Strip . . .

Sheet & Strip Prices, Page 114

Sheet deliveries show little easing. Some producers, even on top ratings, can not promise delivery of open-hearth material before March. Certain sellers refuse to make definite promises, except where bessemer steel is used. In this case at least one Eastern producer is promising six to eight weeks.

Demand is spotty, with little to justify the present strength in schedules at various mills. Apparently, it is explained, mill headquarters are in continued receipt of substantial directives from various procurement agencies which do not clear through local offices.

Some sheet sellers look for a spurt in demand here once PRP quotas for next quarter have been set up. Consumers expect to be advised soon as to these quotas. Word recently was that quotas would be set up and announced to consumers by Dec. 15.

A Chicago district producer is discontinuing production of black sheets of 20-gage and lighter and galvanized, to concentrate activity on other products. It is understood WPB feels that nonintegrated mills have adequate capacity and are best suited to handle these products.

Demand for cold-rolled and galvanized sheets has declined in recent weeks.

Booked to quota capacity through first quarter, narrow cold strip producers are unable to promise definite delivery during that period on new orders unless openings are created by suspension of shipments or new directives. Meanwhile substantial volume is being taken for advance delivery, tentatively into third quarter, but this forward tonnage will be affected by CMP for scheduling and delivery after April 1; importance of most of the strip in the war program indicates most material ordered ahead will be channeled into distribution through CMP by allotment. Although hot strip deliveries are frequently not received as early in the month as desired by rerollers, in general shipments on directives have enabled cold finishers to balance production schedules better. Mill quotas average 75-80 per cent of capacity and backlogs include large tonnages of cartridge steel. Alloy quotas are cut down sharply; tonnage mills are permitted to roll and finish is sold for weeks ahead.

## Plates . . .

Plate Prices, Page 115

Accelerated shipbuilding activity in 1943 is forecast, promising increased plate demand and adjustments are being made in production of other forms of steel to clear the way for maximum plate output. In contrast to structural steel fabricators, those engaged in producing assemblies of plates are working at capacity and demand continues heavy. Much of this work is for ship subassemblies.

Plate buying continues to maintain its recent improvement, although volume is still well below that of a year ago, due to various limitations on use of plates. There is a good assortment of small ship specifications; also an improvement in tonnage from the railroads for maintenance work. Fabricators of special tanks and containers likewise are ordering in better amount.

With possibly one exception, larger shipyards in New England will enter the new year with lower plate inventories than last; fabrication of plates will have been the heaviest in history, and, while shipbuilding expansion is largely responsible, miscellaneous consumption, also indirectly tied to ships, more than offsets losses in large tank and normal industrial requirements. Sheared material continues tight, also heavier flanged and dished volume, but slightly easier position of wide-strip mill production continues. January allocations will reflect inventory conditions and some of the larger reserves built up earlier this year will not be repeated in 1943; smaller shipyards, some with more contracts and usually operating with lower stocks of reserves, are likely to get more plates in scattered instances. Railroad shops, several engaged on direct war work, will also get more steel for rolling stock repairs next quarter, although tonnage will not be large, sufficient only for most urgent maintenance.

## Bars . . .

Bar Prices, Page 114

While stringency in large rounds is greater than ever, deliveries on smaller sizes seem to be easing. Some mills are in position to offer six weeks on rat-

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Designing engineers—men who know materials—find need for Ampco Metal and Ampco-made bronzes in the vital instruments of war. In anti-aircraft gun mounts—in aircraft—in machine tools—bronzes from the Ampco foundries are in service.

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ings down to AA-3 and AA-4. However, this situation may tighten when PRP quotas are set up for first quarter and a number of consumers now holding back until they see where they stand and enter the market.

On cold-drawn bars about the best that can be done, even on top ratings, is February and March on rounds up to about 1 5/16 inches and on large rounds March and April, more likely April. Hot bars required for any orders placed now could not be applied for by cold drawers before Jan. 5 under the present hot bar allocation system and that application would be for February rolling. Consequently, while some of this processed material would be delivered in February, some in all probability would not be shipped until March.

Under the hot bar allocation system, which applies specifically to them, cold drawers are given a definite quantity quota each month. Theoretically, it is pointed out, a cold drawer can specify and receive against this tonnage as his needs dictate. However, where his specifications call for large rounds he not infrequently finds that his supplies do not have rollings available to meet all that might be specified. Consequently, more often than not there is a delay on the larger sizes, which is reflected in the ultimate delivery of large cold-drawn rounds.

While the War Production Board is urging a greater use of bessemer cold-drawn bars, government procurement agencies so far have not reversed their specifications to any material extent so that cold drawers can process any more bessemer than they are doing. A greater emphasis on bessemer will undoubtedly come, it is believed, but it will probably require time to have effect. However, recently some sizable small ammunition orders have been placed, requiring 7/16-inch rounds of high-sulphur bessemer.

Airplane requirements for cold-drawn bars continue heavier than ever, with many processors looking for even present specifications to be greatly overshadowed during coming months. On the other hand, cold drawers report a substantial falling off in gun mount parts and would not be surprised if some substantial cancellations developed.


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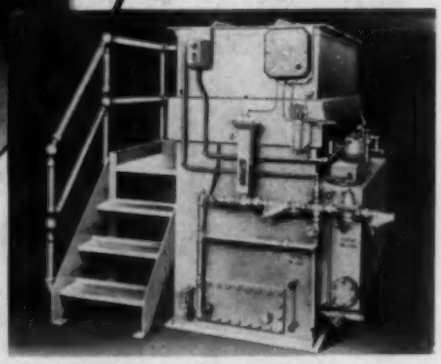

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## Pipe . . .

Pipe Prices, Page 115

Deliveries on steel pipe directives for first quarter are expected to start next month, earlier in the quarter with most mills than was the case in the fourth. Shipments against re-extended ratings under PD83g are also likely to be improved. Directive shipments will amount to only one or two cars to some distributors, but demand has slackened, which would indicate inventories of butt-weld will be in slightly better balance, both in tonnage and sizes. This expected improvement will be less apparent in galvanized, which continues tight, with zinc limited. Slack building activity, a few housing projects excepted, for which pipe purchases drag, steadily lowers pipe demand. Ships and navy yard requirements are maintained for both pipe and tubing.

## Wire . . .

Wire Prices, Page 115

Orders and shipments of wire about balance, demand having eased in some directions, due to revision in war estimates, although it is heavier in others; capacity for production of signal corps wire throughout the country is booked months ahead and demand for rope wire is extremely heavy. Enlarged aircraft program is reflected in heavier orders for numerous alloys. On numerous items mills are sold up to CMP on quotas and some well beyond, the latter to be adjusted by allocation for scheduling and shipment after April 1.

In an effort to eliminate cross-hauls, consumers are being advised to purchase more from nearest suppliers when possible. This is causing confusion and some dislocation of trade relationships. Demand for nails has not abated with monthly production quotas still around 60,000 tons. Heavy rods are tight, more so than lighter sizes, and semi-finished supplies are wider spread to fill high rated orders for finished wire. The services are taking most barbed wire and fence production and little is available for the farm trade.

## Rails, Cars . . .

Track Material Prices, Page 115

While most are contingent upon granting of approval by the War Production Board, several orders for cars and locomotives are being reported. Thus, the Missouri-Kansas-Texas has placed

17 caboose cars with its own shops, and the Ann Arbor, 50 fifty-ton composite hopper cars with the Wabash Railroad company shops.

The Wabash has closed on two 1000-horsepower diesel-electric switch engines, the Ann Arbor on two 660-horsepower diesel-electric switch engines and the Kansas City Southern on four 1000-horsepower diesel-electric switch engines, all to the American Locomotive Co., New York, subject to approval by Washington. The Northeast Oklahoma has placed one 500-horsepower diesel-electric freight locomotive with the General Electric Co., Schenectady, N. Y., and in this case Washington approval has been granted.

The Northern Pacific is inquiring for 300 fifty-ton flat cars and 250 fifty-ton gondola cars.

The Pennsylvania, which recently placed steel requirements for ten locomotives to be built in its own shops under WPB approval, is reported to be in the market for steel for an additional 30 units.

## Structural Shapes . . .

Structural Shape Prices, Page 115

As with plates for many months, structural steel mill rolling schedules will be geared to shipyard requirements to a greater degree during the months ahead. Tentatively placed at 325,000 tons a month, a drop from approximately 480,000 tons at mid-year, most of the rolled product will by-pass fabricating shops to shipyards. Construction and engineering requirements are cut to the bone and will be under the present program for the duration unless another unlooked for expansion in the war industrial plant is deemed necessary. With meager tonnage therefore slated for building, few projects approved under an AA-2 rating, rollings each month will depend largely on ship needs and lend-lease and may be greater or smaller than 325,000 tons.

## Scrap . . .

Scrap Prices, Page 118

Onset of winter weather has caused some apprehension among scrap consumers that supply of this material may be curtailed sufficiently to interfere with full steel production. Retardation of collection and interference with outdoor work in sorting adds to handling difficulties already severe from lack of sufficient labor. In some areas scrap collected in the autumn household drives remains at the centers where it had been piled and has not been moved to scrap yards. Some of this is in rural communities and truck capacity can not be obtained to move it to yards.

Already some shortages have developed, one melter in the St. Louis district being forced to take off open hearths because of insufficient scrap. At other centers sufficient is in stock piles to maintain present consumption but in some cases current receipts are not large enough to meet demand for melting and tonnage is being taken from reserves.

A Buffalo melter with considerable tonnage has shipped some reserves to its mills in another district where supply is short. Another Buffalo steelmaker has taken 10,000 tons from its stockpile in the past fortnight, as current supplies fell below needs. At the same time scrap yards have large supplies which they are unable to ship because of lack of manpower.

Detroit consumers are well supplied and pressure for shipments has subsided. However, supplies are unbalanced, lighter and poorer grades predominating, with mills hungry for good heavy melting steel. Some cast scrap has been offered below OPA ceilings, as foundries are not in need. Turnings are building up to disproportionate tonnage as a result of increased production of aircraft engine parts. Mills do not like to accept these loose and baling is a problem. A large proportion of these turnings are of alloy steels.

Receipts in the St. Louis district have fallen off sharply in the past two weeks and one mill has been forced to curtail open-hearth operations. Two others report they have only ten days' supply and the best situated interest has 30 days' supply. Weather conditions and diversion of scrap from the Southwest to Ohio valley centers are blamed for this condition. Yet considerable tonnage is available in rural communities, which has not been moved since the salvage drive last fall. Much agricultural scrap of desirable grade is included in these piles.

Cincinnati melters are well supplied for current needs and little is in demand except No. 1 cast and steel rails. All shipments are being accepted by mills

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but pressure is off. Considerable material from public drives remains unprepared and is gradually coming into the market.

Shipments of tin cans from Chicago to detinning plants in that district have reached a rate of 200 tons per week, it is announced by the Office of Civilian Defense. Total shipments since Aug. 1, date of the first consignment, total 1425 tons. It is stated also that in the period Sept. 28 to Nov. 20, brewers, bottlers and crown cap manufacturers, have turned in more than 142 tons of cans to salvage officials.

### Pig Iron . . .

Pig Iron Prices, Page 116

Despite the fact that some foundries have difficulty obtaining war work and find it necessary to reduce schedules at least for the time being, the general pig iron melt appears well sustained. This undoubtedly can be accounted for by heavier operations in other plants. While most foundries do not plan to take off much time for inventory this year, it is believed some slowing up around the end of this month will develop, due in part to holiday influences.

### Iron Ore . . .

Iron Ore Prices, Page 117

Final figures on iron ore movement for the 1942 season show 92,076,781 gross tons were moved, an increase of 11,960,421 tons, 14.93 per cent, more than the 80,116,360 tons shipped in the 1941 season, according to the Lake Superior Iron Ore Association, Cleveland. This sets an all-time record, as the 1941 tonnage was the largest ever moved up to that time. Superior, Duluth, Two Harbors and Escanaba set new records for shipments but Marquette and Ashland fell somewhat behind their 1941 tonnage.

December ore shipments totaled 635,829 tons, which was 199,252 tons less than in December, 1941, 23.86 per cent. This resulted from freezing weather, which slowed handling of ore to docks and into ships.

Details of December ore shipments are as follows:

| | Dec., 1942 | Dec., 1941 |
|---|---|---|
| Escanaba | 62,691 | . . . . |
| Marquette | 52,566 | 52,145 |
| Ashland | 21,866 | 8,294 |
| Superior | 107,339 | 179,524 |
| Duluth | 228,227 | 383,350 |
| Two Harbors | 163,140 | 199,685 |
| Total U. S. | 635,829 | 822,998 |
| Michipicoten | . . . . | 12,083 |
| Grand Total | 635,829 | 835,081 |

Decrease from year ago, 199,252.

Figures for 1942 and 1941 season shipments, with comparisons, are as follows:

| | Season, 1942 | Season, 1941 |
|---|---|---|
| Escanaba | 6,255,360 | 4,513,079 |
| Marquette | 4,859,005 | 5,658,672 |
| Ashland | 6,180,293 | 6,227,450 |
| Superior | 31,528,615 | 27,745,737 |
| Duluth | 23,968,309 | 20,498,781 |
| Two Harbors | 18,812,328 | 15,011,066 |
| Total U. S. | 91,603,910 | 79,654,785 |
| Michipicoten | 472,871 | 461,575 |
| Grand Total | 92,076,781 | 80,116,360 |

Increase from year ago 11,960,421.

### Warehouse . . .

Warehouse Prices, Page 117

Improved deliveries of replacements to warehouse have broadened to alloys, notably NE steels, and in spots to larger cold-finished rounds. Receipts of SAE alloys are light, material from left-over heats. In some directions demand for alloys has temporarily slackened, due to expiration of priorities pending PRP allocations for first quarter; nevertheless many alloy replacements are moved direct to consumers as received, without going onto racks. Further betterment of alloy shipments and cold-finished bars is promised for next quarter. Most hot-rolled products have eased materially, black and galvanized sheets less so with some mills, although some jobbers have taken in more heavy black sheets against extended ratings wanted earlier in the quarter. Heavier gages have been tighter than light sizes, 18 gage and smaller; demand for the latter is slow and some distributors are temporarily overstocked.

### Tin Plate . . .

Tin Plate Prices, Page 115

Schedules for tin plate production have been increased this month and further expansion is indicated for January. The current rate in some instances is approaching 50 per cent of capacity. The tendency is toward utilization of

*then it's time to investigate the*

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bessemer steel for this purpose and future production may be mainly of this grade, to relieve pressure for open-hearth steel.

## Steel in Europe . . .

**London** — (*By Radio*) — Steel deliveries in Great Britain are becoming more extended on some products, especially plates. Heavier tonnages are to be required for next year's orders. Production of alloy steels is being increased. Light structural sections are in active demand.

## Reinforcing Bars . . .

**Reinforcing Bar Prices, Page 115**

Supply of concrete reinforcing bars has eased to such an extent the material has been removed from the group 1 critical list to group 2, covering products available equal to demand; it appears possible reinforcing bars will be classified in group 3, materials with a surplus over demand. Heavy lumber is in group 2 and a directive again switching much construction and engineering work from heavy timber to reinforced concrete is being considered. Timber has tightened materially while bars have eased. Such a directive would materially stimulate demand for steel reinforcing and ease pressure on heavy lumber.

While production of concrete bars has been cut back at all mills, demand has fallen off more and distributor stocks are heavy in some cases and well balanced as to sizes. Buying is confined to small lots. This easiness is resulting in price shading and off-heat material normally worked into concrete bars at mills is going back as scrap.

## Refractories . . .

**Refractories Prices, Page 116**

Demand for refractories is increasing and it is now relatively difficult to get special refractory brick for lining furnaces, converters, and the like. The refractories market has tightened up to such an extent that deliveries are not being made in every instance as promised.

Market interests believe the reason is twofold. In the first place, operations are at such a high level that wear and tear on refractories is much higher than normally. In steelmaking, particularly, speed-up methods have proved most harmful on furnace linings. The increasing use of the duplex process and 100 per cent hot metal charges have reduced the length of life on open-hearth linings, and consequently increased demand for refractories.

Most steel producers, also, are ordering ahead on refractories in order to have the material on the ground when it is necessary to take a furnace off for relining. As a result, the backlog of brick held by most steel plants is higher than normal.

It is also true that the expansion program is beginning to be felt, new units have reached the stage where refractories are required and shipments against orders for these projects are increasing constantly.

There is a growing tendency to make wider use of natural refractories, such as firestone, to augment production facilities of brick manufacturers. This is particularly true in bessemer converters, where life of the lining is relatively short and relining is frequent.

## Semifinished . . .

**Semifinished Prices, Page 114**

Independent sheet manufacturers are renewing efforts to get a better share of the semifinished quota, and although their efforts have not met success, there is some feeling that increasing steel output, and a lower Lend-Lease quota, may result in some action more favorable to nonintegrated sheet producers.

Pressure also is being brought on Washington to guarantee nonintegrated producers a larger percentage of open-hearth steel in their supply of semifinished. Supply of bessemer steel has been excellent in most cases, and in several instances additional bessemer steel sheet bars have been available over the mill quota. This has not been true in open-hearth, however, and the percentage of open-hearth steel going into nonintegrated mills quota has consistently run 40 per cent or below, the balance being bessemer.

Representatives of nonintegrated sheet mills have done an excellent job in getting their customers to take bessemer steel sheets rather than specifying open-hearth. In some cases bessemer has been accepted, even where difficult

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drawing jobs were involved, and results indicate that in all but the most difficult cases, bessemer has been acceptable.

### Pacific Coast . . .

**Seattle**—The Seattle-Tacoma Shipbuilding Corp. announces it will expand its Tacoma yard, adding 60 acres to the present 180-acre area, and will spend about $6,000,000 in improvements, including shops, warehouses and storage structures and increased facilities. The release was made by Manager A. O. Tucker. The company is anticipating after-the-war operation and has submitted to the navy a small aircraft carrier, designed by Wm. F. Gibbs, New York naval architect. If the plan is adopted construction work will proceed indefinitely.

Washington State Planning Council has sponsored tests of Columbia river black magnetic sands for iron ore to see if results will justify electric processing. The survey is being made by Dean Milnor Roberts of University of Washington College of Mines. Bureau of Mines will test at the Salt Lake City plant alumina clay from Stevens county, Washington, with a view of supplying raw materials to operating plants in this state, which it is believed cannot compete after the war under the present long haul of alumina. Bonneville Power Administration will aid proposed survey of areas in eastern Washington by communities which are satisfied that abundant raw materials are available to supply the modern aluminum and magnesium plants, now engaged in producing essential war items.

Pacific Northwest solid fuel coordinator expresses the fear that Washington state will experience a coal shortage this winter. State production has been increased 400,000 tons but this is insufficient to meet the increased demands of industrial expansion.

Announcement by E. R. Hoffman, manager of Seattle's light plant, states that the major power and light systems in the Northwest area are co-operating in interchange of power in the interest of fuel saving.

Wholesale jobbers report that new federal regulations have improved their position in allowing them increased quotas. However, the demand continues so urgent that material is shipped out as quickly as received and there is no chance to accumulate inventories. Galvanized sheets and cold-finished bars have not been eased but warehousemen are hopeful of larger receipts and quicker deliveries.

Federal funds to the total of $1,700,000 has been granted for construction of the Bow Lake airfield between Seattle and Tacoma. The contract has been awarded to California bidders at $2,383,744.

Pacific Water Works Supply Co. is sole bidder at $21,682 for furnishing District 63, Seattle, with 34,115 ft. 4 to 8⅝ in. lap welded steel pipe. Inquiry for cast iron pipe is slow because of priority difficulties.

Rolling mills report continued lack of demand for reinforcing bars but merchant bars are being rolled in heavy tonnages due to call from shipyards. Present stocks of scrap are sufficient and much material, gathered during recent drives, still lies on the ground uncollected and awaiting sorting. Present supplies will carry over well into first quarter under present operating schedules.

### Canada . . .

**Toronto, Ont.** — Canadian steel-making activities continued at virtual capacity during the week, but there is a possibility that ingot output may drop to about 96 per cent over the year-end as a result of closing down four open hearths by Algoma Steel Corp., Sault Ste. Marie, for repairs. It is stated, however, that these repairs will be rushed and little time will be lost.

Canadian industrial interests are watching the swing over in the United States to the Controlled Materials Plan and while some interests in this country appear to favor similar action by the Canadian government, others are doubtful that it could be satisfactorily worked out. It is claimed that the introduction of CMP in Canada would require setting up an entirely new government department for supervision and approval of iron and steel sales. At present pig iron sales are put through on a plan somewhat similar to CMP. That is, all merchant iron orders must be submitted to the steel controller, and shipments are made only on his approval. It is

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claimed that if full control of all steel items, regarding order placements and shipments, was vested in the steel controller and his department had to pass on each individual order, a large and experienced staff would have to be established.

During the past couple of weeks imports of steel from the United States have gained, as far as war deliveries are concerned. A Canadian consumer that has been receiving fairly regular shipments of steel from the States, but has been confined to lots of about 700 pounds, last week was surprised by a shipment of 15 tons. While this was well above his regular quota no complaint was raised and the delivery was accepted without question. It also is reported that other Canadian buyers have experienced similar improvement in deliveries from across the line, and at least one American steel representative in this area has recently made a quite substantial offering of steel tonnage to a local consumer.

There has been no betterment in supply of high carbon and alloy bars from domestic producers but improvement was reported in deliveries from the United States. Improved imports have enabled most Canadian war plants to obtain sufficient supplies of special steels to carry them through the year-end. Other bars are in good demand but no actual shortage is reported.

Structural shape lettings were dull, dropping to around 1200 tons, chiefly due to government restrictions on new construction projects. Awards for the week were mostly under 200 tons, which compares with individual orders ranging from 1,000 to as high as 8000 tons a year ago. Demand for reinforcing bars is fairly active in connection with some uncompleted government projects.

Merchant pig iron sales rose to slightly better than 10,000 tons during the week, the improvement largely centering around basic iron for electric furnaces. Basic iron sales rose to about 2500 tons, while foundry iron held around 3000 tons and malleable approximately 4000 tons for the week.

## Mahoning Engineers Group Elects New Officers

Harry L. McFeaters, chief engineer, Pennsylvania Engineering Works and Mead-Penn Iron Works Co., New Castle, Pa., was elected president of the Mahoning Shenango Valley Engineers Society at the annual election of officers held in New Castle Dec. 9. Paul G. Dingledy, Pennsylvania Power Co., was made vice president; Sid L. Lockley, Lockley Machine Co., was re-elected treasurer; and L. L. Weitzel, Wean Engineering Corp., Warren, O., was elected secretary.

Elected members of the council were F. J. Bowers, Falk Corp., and Thomas E. Baum, Atlantic Refining Co.

Guy Hubbard, machine tool editor of STEEL, discussed the machine tool industry, its past, present and future.

## Simplifies NE Steel Choice, Treatment

A new booklet on NE Steels has just been published by Joseph T. Ryerson & Son Inc. The data book deals with the selection and heat treating of NE Steels, but it explains the subject without the confusion of curves, graphs and technical wordage. Copies are available on request.

The Jominy end quench hardenability test, a quick method of determining the heat treatment response, is carefully explained step by step and a cut-away diagram shows the test in action. Because the Jominy test is the simplest and quickest way of determining hardenability, the Technical Committee of the American Iron and Steel Institute adopted it as the standard for testing NE steels. This is easy to make and accurate, but the interpretation of the test results has, heretofore, been more or less of a mystery to many steel users.

The booklet includes four tables for converting Jominy test results into tensile strength, yield point, elongation, reduction of area, etc. One table in-

When charging high scrap mixtures in basic open hearth practice . . . stop expensive foamy reactions, hot roofs, and soft heats . . . use No. 34-30 Mexican Graphite under the lime to give efficient, dependable carbon recovery . . . provides a good working period and helps clean up the hearth quickly . . . contains no sulphur or harmful impurities . . . avoid carbon delays and make steel more quickly with a modern recarburizer highly efficient . . . full particulars and prices quoted upon request.

THE UNITED STATES GRAPHITE CO.
SAGINAW MICH.
NO. 34-30 MEXICAN GRAPHITE

## Nonferrous Metal Prices

| Dec. | Copper: Electro, del. Conn. | Copper: Lake, del. Midwest | Copper: Casting, refinery | Straits Tin, New York: Spot | Straits Tin, New York: Futures |
|---|---|---|---|---|---|
| 1-17 | 12.00 | 12.12½ | 11.75 | 52.00 | 52.00 |

| Lead N. Y. | Lead East St. L. | Zinc St. L. | Aluminum 99% | Antimony Amer. Spot, N.Y. | Nickel Cathodes |
|---|---|---|---|---|---|
| 6.50 | 6.35 | 8.25 | 15.00 | 14.50 | 35.00 |

*F.o.b. mill base, cents per lb. except as specified. Copper and brass products based on 12.00c Conn. copper*

**Sheets**

| | |
|---|---|
| Yellow brass (high) | 19.48 |
| Copper, hot rolled | 20.87 |
| Lead, cut to jobbers | 9.75 |
| Zinc, l.c.l. | 16.15 |

**Tubes**

| | |
|---|---|
| High yellow brass | 22.23 |
| Seamless copper | 21.37 |

**Rods**

| | |
|---|---|
| High yellow brass | 15.01 |
| Copper, hot rolled | 17.37 |

**Anodes**

| | |
|---|---|
| Copper, untrimmed | 16.12 |

**Wire**

| | |
|---|---|
| Yellow brass (high) | 19.73 |

**OLD METALS**

*Dealers' Buying Prices*
(In cents per pound, carlots)

**Copper**

| | |
|---|---|
| No. 1 heavy | 9.25-10.00 |
| Light | 7.25- 8.00 |

**Brass**

| | |
|---|---|
| No. 1 composition | 8.50- 9.00 |
| Yellow brass castings | 5.50- 6.00 |
| Auto radiators | 6.12½-6.62½ |
| Red brass, borings & turnings | 8.00- 8.50 |

**Zinc**

| | |
|---|---|
| Old | 4.75- 5.00 |
| New clippings | 6.00- 6.50 |

**Aluminum**

| | |
|---|---|
| Clippings | 9.75-10.25 |
| Cast | 8.75- 9.25 |
| Pistons | 8.50- 8.75 |
| Sheet | 8.75- 9.25 |

**Lead**

| | |
|---|---|
| Heavy | 4.75- 5.25 |
| Mixed babbitt | 5.25- 5.50 |
| Electrotype shells | 5.00- 5.50 |
| Stereotype, Linotype | 6.00- 6.75 |

**Tin and Alloys**

| | |
|---|---|
| Block tin pipe | 44.00-46.00 |
| No. 1 pewter | 32.00-36.00 |
| Solder joints | 7.75- 8.50 |

**SECONDARY METALS**

| | |
|---|---|
| Brass ingot, 85-5-5-5, l.c.l. | 12.50 |
| Standard No. 12 aluminum | 14.50 |

**MAGNESIUM**

(12 pound rod, 4 in. diam.)

| | |
|---|---|
| 99.8% ingot, carlots | 22.50 |
| 100 lb. to carlots | 24.50 |
| Extruded sticks, ¼ to 2 lb. | |
| Carlots | 32.00 |
| 100 lb. to carlots | 34.00 |


Our Duty For the Duration

In a total war, the efforts of every man, woman and yes, child, count in the final victory. Our obligation consists of (a) helping to conserve precious tin supplies, and (b) seeing to it that proper bearing metals find their way into every shop, mill and plant where war production is in full swing. Our primary obligation is being met by supplying Cadman Acorn Brand Babbitt Metal only in cases where its peculiar properties are vital, and where investigation proves that it is necessary. This practice will save tin. Our secondary obligation is being met by supplying BEARITE, a low tin base (less than 1½% tin) babbitt metal for all bearing applications having rotary motion. BEARITE has been proven by 20 years of general use, and gives comparable service.

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dicates the cooling rate at various distances from the quenched end of a Jominy test sample. Another table gives the cooling rates at center, half radius and surface for 1-inch, 2-inch and 3-inch round bars quenched in oil and water. A third table shows the approximate relationship of physical properties to hardenability. The last table gives the approximate relationship between drawing temperatures and tensile strength.

The various NE Steels are listed as suggested for standard compositions in the carburizing, medium hardening and high hardening groups. The booklet also shows average physical properties after treating together with forging, normalizing, annealing and quenching temperature for thirty of the most widely used NE Steels. Available stock sizes in the various NE analyses both hot and cold rolled are also given.

Since the beginning of the NE Alloy Steel program, the Ryerson company has been encouraging industry to switch to the "lean" alloy compositions in order to promote the conservation of critical alloying elements. Hundreds of tests on NE Steels have been made in the Ryerson laboratory in developing data to assist in the proper application and treatment of the new steels. The laboratory has also proved invaluable for speeding deliveries of steels that must be tested to demonstrate their ability to meet various government specifications. Additional heat treating and testing equipment is constantly being added to keep pace with the demand for steels of accurately known physical properties. Much of the information and experience gained in the Ryerson laboratory has contributed to the new NE Steel booklet.

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1. Undercut carbon steel shank, leaving a fillet for ease in welding.
2. Fill undercut, using ordinary hard facing welding procedure.
3. Hot wipe, to approximate shape, to save grinding.
4. Wet grind, using green silicon carbide rough and finish wheels.

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# NEW BUSINESS

## Plant Expansion, Construction and Enterprise, Government Inquiries, Sub-Contract Opportunities, Contracts Placed and Pending

## SUB-CONTRACT OPPORTUNITIES

**Data on subcontract work are issued by regional offices of the War Production Board. Contact either the office issuing the data or your nearest field office. Write, don't telephone, and mention key letters and numbers appearing before each item to assure prompt attention and avoid delay.**

**Minneapolis office, Contract Distribution Branch of WPB, 334 Midland Bank building, is seeking contractors for the following:**

**S.O. No. 294:** Part, recoil cylinder, approximately 38 inches long, 5 inches diameter. Equipment, horizontal boring mill, 3-inch or larger; milling, No. 3; welding. Operations, boring and honing of wide diameter I.D.; machining of various brackets and welding of brackets to O.D. Quantities, large. Tolerance, .001. Material, forgings, furnished. Drawings at Minneapolis office.

**S.O. No. 295:** Part, connector, heater fuel line. Facilities required, automatic screw machine, ⅞-inch hex x 3 inches. Operations, drilling, reaming, turning, threading (two setups required). Quantity and delivery not stated. Tolerance, .002; class 3 thread. Material, ⅞-inch hex stainless steel, type 416. Drawings at Minneapolis office. Part, fuel mixture outlet fitting. Facilities required, automatic screw machine, ⅞-inch hex x 3 inches. Operations, drilling, reaming, turning, threading (two setups required). Quantity and delivery not stated. Tolerance, .002, class 3 thread. Material 3.4-inch hex stainless steel, type 416. Drawings at Minneapolis office.

**S.O. No. 297:** Part, spacer ring, 5 inches diameter x 1 inch. Facilities required, engine lathe, 12 inches or larger. Operations, turning and facing. Quantity, 9000 at 1500 per month, starting Dec. 15. Tolerance, .001. Material, magnesium alloy AN-QQ-M-56 Comp. A. Drawings at Minneapolis office.

**S.O. No. 299:** Part, outer clutch member, 13-inch diameter x 5 inches. Facilities required, large lathe, 24-inch or larger or vertical boring mill; internal gear cutter. Operations, turning, boring, drilling, tapping and internal gear cutting. Quantities, 500 to 1500. Delivery, soon as possible. Tolerance, .002. Material, heat treated forgings, furnished by prime contractor. Tooling to be quoted separately. Drawings at Minneapolis office. Secondary annulus, final drive, 21-inch diameter by 10 inches. Facilities, large lathe, 30-inch or larger; internal gear cutter. Operations, turning, boring, drilling, tapping, internal gear cutting. Quantities, 500 to 1500. Delivery, soon as possible. Tolerances, .002. Material, heat treated forgings furnished by prime contractor. Tooling to be quoted separately. Drawings at Minneapolis office.

**S.O. No. 301:** Part, valve spring washer. Facilities required, screw machines, 2.06-inch diameter; heat treating. Quantities, very high. Delivery, soon as possible. Tolerance, .001 in six-inch on tapered hole. Material, nickel-chromium steel. Drawings at Minneapolis office.

**S.O. No. 302:** Numerous small arms parts. Operations, various, depending on the part, milling, profiling, grinding, heat treating, forging, screw machine, etc. Quantities and deliveries not stated. Prime contractor will consider any qualified subcontractor. Drawings at Minneapolis office.

**S.O. No. 303:** Part, coupling, 4 x 9 x 3½ inches. Facilities required, milling, No. 2 or larger; drilling and reaming. Quantities, 500, 1000, 1500 or 2000, early delivery of prime importance. Tolerance, .002, on reamed hole. Material, steel casting, immediately available. Part, elevating sleeve, 2.174-inch O.D. x 16 inches. Facilities required, turning, boring, threading (internal). Quantities, 500 to 2000, early delivery of prime importance. Tolerances, .003. Material cold-rolled unannealed seamless tubing. Part, traversing nut, 2⅜ x 3½-inch. Facilities, milling, No. 2 or larger; drilling; tapping, class 2. Quantities 500 to 2000, early delivery of prime importance. Tolerance, .002 on reamed hole. Material, steel casting, immediately available. Drawings all three parts at Minneapolis office.

**S.O. No. 304:** Part, jigs, fixtures, tooling. Facilities required, tool room. Quantities, one to five. Precision work. Material, subcontractor to furnish. Instrument manufacturer has continuous need for special jigs, fixtures and tooling. Price on quotation basis. Drawings at Minneapolis office.

**New York office, Contract Distribution Branch of WPB, 122 East Forty-Second street, New York, reports the following subcontract opportunities:**

**S-76-6321:** Northern New York concern seeks open capacity on small Peterman staff machines (automatic screw machines).

**S-76-6129:** Long Island concern seeks facilities to fabricate metal bottles in four lengths, 6, 8, 10 and 12-inch, 4 inches wide. Material, 4130 steel, .070 sheet. Equipment needed, deep-drawing press, annealing ovens, spinning and threading machines.

**S-76-6322:** New York City manufacturer seeks multispindle automatic screw machine facilities, $\frac{1}{16}$ to 2½ inches. Must also have chrome plating facilities. Quantity, 30,000 per month for a year. Material, 1130 steel. Tolerance, close.

**S-76-6378:** New York City corporation needs automatic screw machine facilities, 3½-inch or larger. Material, 3135 steel, which is furnished.

**Boston office, Contract Distribution Branch of WPB, 17 Court street, is seeking contractors for the following:**

**S.C. 31:** Multiple-spindle screw machine work for machines having bar capacities from $\frac{1}{16}$ to ¾-inch. Secondary operations of drilling. Five items involved. Also one mechanical press item 1.30-inch diameter x .40-inch overall thickness. Material, brass and steel, supplied by prime contractor. Continuous production at rate of 25,000 each item per month. Reference 1-K-35.

**S.C. 32:** Mechanical or hydraulic press work to accommodate dies 34½ inches long, 15 inches wide, 20 inches high. Fifty pieces made from steel ⅛-inch thick. Material and dies supplied by prime contractor. Reference 1-F-370.

**S.C. 33:** Vertical boring mill work for machine having a 100-inch diameter table. Also secondary operations on radial drill. Six units wanted. Approximate weight 2000 pounds each. Iron castings supplied by prime contractor. Reference 1-F-371.

**S.C. 34:** Machine work for planers having minimum table width of 48 inches, two or more heads. Material, gray iron, supplied by prime contractor. Continuous production on several sizes, ranging from 1000 to 10,000 pounds each. Delivery requirements to capacity of subcontractor's facilities. Machine tool builder's tolerances. Reference 1-C-78.

**Detroit office, Contract Distribution Branch, Production Division, WPB, Boulevard building, is seeking contractors for the following:**

**Job No. 3242:** Propeller shaft thrust bearing spacer. AMS 6470 steel, which is furnished. Equipment, turret lathe, 4¾-inch swing; lathe; sensitive drill; internal and external grinders; tin plate, nitriding. Order is for 1000 per month on AA-1 priority.

**Job No. 3244:** Valve spring washer, upper. AMS 6332 steel, 2$\frac{7}{16}$-inch O.D. Equipment, hand screw machine, internal grinder, speed lathe, cadmium plate. Order is for 25,000 per month on AA-1 priority.

**Job No. 3365:** Machining operations on gear. SAE 3245. Forgings are furnished. Equipment, lathe 9$\frac{7}{32}$-inch O.D. three operations, sensitive drill, gear lapper, bevel gear cutter, universal or vertical mill, band or doall saw, heat treat, magnaflux. Priority is AA-1. Order is for 1500 to 2000.

**Job No. 3366:** Machining operations on pinion. SAE 3245. Forgings are furnished. Equipment, lathe 8$\frac{11}{32}$-inch O.D., sensitive drill, bevel gear cutter, gear lapper, universal or vertical mill, horizontal mill, heat treat, magnaflux. Order is for 1500 to 2000 on AA-1 priority.

**Job No. 3367:** Machining operations on pinion. SAE 3245 steel. Forgings are furnished. Same equipment as on job No. 3366, same number and priority.

**Job No. 3368:** Machining operations on gear. SAE 3245. Steel forgings are furnished. Equipment, lathe 9¼-inch O.D., universal or vertical mill, sensitive drill, bevel gear cutter, gear lapper, band or doall saw, heat treat, magnaflux. Order is for 1500 to 2000 on AA-1 priority.

**Jobs No. 3494 to 3499:** Forging sources only on open and closed sockets from ¼ to ⅞-inch. Material is SAE 1033 steel and is furnished. Quantity, 6000 to 20,000 on each order. Samples in exhibit room.

**Job No. 3513:** Slack adjuster worm gear. SAE 1350 steel 2$\frac{13}{32}$-inch is furnished. Equipment, screw machine or turret lathe. Order is for 6000 on schedule of 250 to 400 or more per day. Priority A-1-a.

**Philadelphia Office, Contract Distribution Branch, Production Division, WPB, Broad Street Station building, reports the following subcontract opportunities:**

**Roystuart 64-1:** Pennsylvania concern requires subcontracting facilities for machining reciprocating steam engine cylinders. Equipment, four-foot radial drill; vertical boring mill, 129-inch swing, 73½-inch under bar; planer, width 80 inches. equipped with top and side cutter heads. Overall dimensions, 93½ x 79½ x 73½ inches. Cylinder bore diameter, 28.250 plus or minus .001. Material, semi-steel. Castings may be furnished either by prime or subcontractor. Prints and specifications at Philadelphia office.

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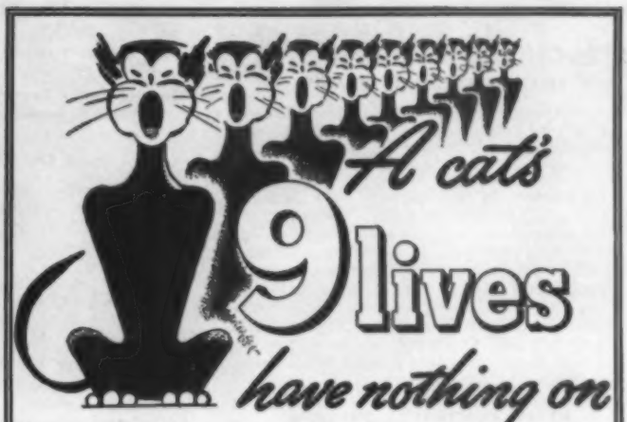

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## STRUCTURAL SHAPES...

### SHAPE CONTRACTS PLACED

500 tons, spillway bridge, Shasta Dam, Coram, Calif., to Mississippi Valley Structural Steel Co., Decatur, Ill.

100 tons or more, one 50-ton and one 25-ton navy yard crane, Boston, to R. W. Kaltenbach Corp., Cleveland, $312,187; also four 10-ton gantry cranes, navy yard, Norfolk, Va., $179,800, and one 15-ton jib crane, navy yard, Philadelphia, $120,500, to same contractor. Star Iron & Steel Co., Tacoma, Wash., awarded one 15-ton dry dock crane for a navy yard, $119,000; Marion Steam Shovel Co., Marion, O., given three 40-ton jib cranes, navy yard, Boston, $192,600; Bureau of Yards & Docks contracts.

### SHAPE CONTRACTS PENDING

1000 tons or more, 18,000-ton floating dry dock and four sections of sectional steel floating dry dock, Bureau of Yards & Docks, Navy department, Everett, Wash.; Everett-Pacific Co., Everett, Wash., contractors; estimated including fee, $7,005,725.

## RAILS, CARS . . .

### CAR ORDERS PLACED

Ann Arbor, 50 fifty-ton composite hopper cars, to Wabash Railroad shops, subject to WPB approval.

Missouri-Kansas-Texas, 17 caboose cars, to company shops, subject to WPB approval.

### CAR ORDERS PENDING

Northern Pacific, 250 fifty-ton gondolas and 300 fifty-ton flat cars, bids asked.

### LOCOMOTIVES PLACED

Ann Arbor, two 660-horsepower diesel-electric switch engines, to American Locomotive Co., New York, subject to WPB approval.

Kansas City Southern, four 1000-horsepower diesel-electric switch engines, to American Locomotive Co., New York.

Northeast Oklahoma, one 500-horsepower diesel-electric freight engine, to General Electric Co., Schenectady, N. Y.; approval granted by WPB.

Wabash, two 1000-horsepower diesel-electric switch engines, to American Locomotive Co., New York, subject to WPB approval.

## PIPE...

### CAST PIPE PENDING

475 tons, 12,000 feet, 12-inch, cement-lined, Panama sch. 572; bids in.

# CONSTRUCTION AND ENTERPRISE

### OHIO

AKRON, O.—Portage Machine Co., 549 Miami avenue, plans several additions to factory.

CLEVELAND—Forest City Foundry Co., 9327 Maywood avenue, is expanding loading dock space and is adding extension to shed. W. R. Seelbach is general manager.

CLEVELAND—Bowman Auto Supply Co., 6853 Broadway Southeast, has leased 10,000 square feet at 3540 East Seventy-second street, for expansion of its machinery-making business.

CLEVELAND—Addressograph-Multigraph Corp., 1200 Babbitt road, Euclid, O., has received authorization from Defense Plant Corp. to provide machinery and equipment in its plant at cost in excess of $350,000. J. E. Rogers is president and general manager.

CLEVELAND—Basic Refractories Inc., Howard P. Eells Jr., president, Hanna building, is building a $330,000 kiln unit at its plant northwest of Tiffin at Maple Grove. Capacity will be increased by nearly one-third.

CLEVELAND—Efficient Tool & Die Co., 9314 Elizabeth avenue Southeast, has let contract to Bolton-Pratt Co., for one-story plant. Herman W. Maurer is architect.

CLEVELAND—Contract for a building to be known as the wheel grinding building at the New York Central Railroad machine shops in Collinwood has been awarded to A. M. Higley Co.

CLEVELAND—An addition to the plant of Monarch Aluminum Co., 9301 Detroit avenue, will be built by H. L. Vokes Co.

SHELBY, O.—Miller-Shelby Products Division of Michigan Steel Tube Co. has completed a one-story addition to plant here and will double production capacity after machinery is installed in the next 90 days.

YOUNGSTOWN, O.—Youngstown Tool & Die Co., Keefer road, Girard, O., has filed incorporation papers, to manufacture tools, jigs and dies. Agent for the new firm is William Brass. Keefer road, Girard, Youngstown R.F.D. 3.

### CONNECTICUT

STAMFORD, CONN.—Reflectone Inc., lessee, 67 Greenwich avenue, is altering factory at 114 Manhattan street.

### NEW JERSEY

ELIZABETH, N. J.—Pabst Engineering Equipment Co., 676 Pennsylvania avenue, is preparing plans for crane shed. Cost $40,000.

### PENNSYLVANIA

CALLERY, PA.—Mine Safety Appliances Co., T. J. Ryan, president, 300 Braddock avenue, Pittsburgh, has let contract for one-story storage building to Navarro Corp., 6219 Broad street, Pittsburgh. Prack & Prack, 517 Martin building, architects.

ERIE, PA.—Erie Resistor Corp., B. B. Minnium, engineer, 644 West Twelfth street, will build two-story plant costing $50,000.

PHILADELPHIA—Industrial company has plans by United Engineers & Constructors Inc., 1401 Arch street, Philadelphia, for rehabilitating manufacturing buildings.

### MICHIGAN

DETROIT—Bassler Carter Co., 8550 Lyndon street, has let contract to Austin Co. for addition to its warehouse.

DETROIT—Johnson-Larsen Co., Detroit, has contract for an addition to the boiler house of the Detroit Tank Arsenal of Chrysler Corp., in Warren township, Macomb county.

DETROIT—Hydraulic Machinery Inc., 10421 Grand River avenue, has let general contract for factory addition to Campbell Construction Co., 3255 Goldner avenue. Total cost estimated at $75,000.

### ILLINOIS

CHICAGO—Commonwealth Edison Co., 72 West Adams street, has let contract to Herlihy Mid-Continent Co., 140 South Dearborn street, for remodeling electric power station. Estimated cost $75,000. Sargent & Lundy, 140 South Dearborn street, engineers.

### INDIANA

FORT WAYNE, IND.—Magnovox Corp., R. A. O'Connor, president, Buetter road, has let contract for one-story addition to Max Irmscher & Sons Inc., Old First Bank building. Cost $100,000. A. M. Strauss, 415 Cal-Wayne building, architect.

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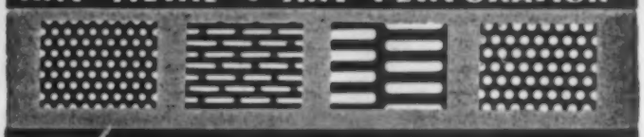

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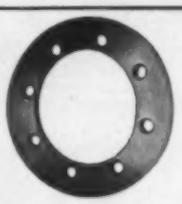

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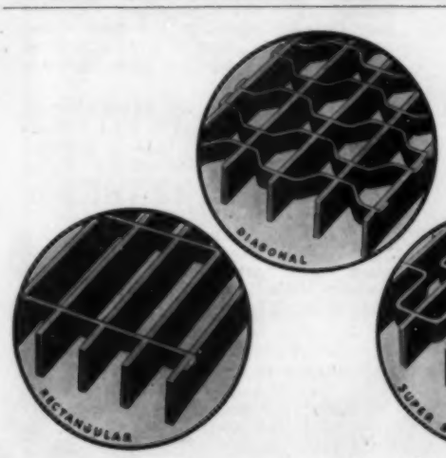


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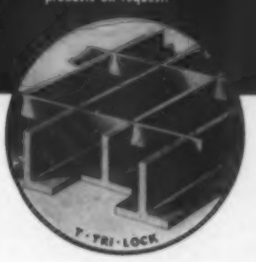


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### DISTRICT OF COLUMBIA

WASHINGTON—Defense Plant Corp., Washington, plans construction of hemp processing plants at Bird Island, Blooming Prairie, Blue Earth, Grove City, Hutchinson, Jackson, LaFayette, Lake Lillian, Le Sueur, Mapleton, New Richland, Paynesville, Sherburn and Wells, Minn., to cost about $200,000 each, including about $100,000 for machinery and equipment. Plants will be leased by Commodity Credit Corp.

WASHINGTON—Defense Plant Corp., Washington, will build hemp processing plants at Algona, Boone, Britt, Eagle Grove, Fort Dodge, Greene, Grundy Center, Hampton, Humboldt, Iowa Falls, Mason City, Osage, Story City, Traer and Webster City, Iowa. Plants will be leased by Commodity Credit Corp.

WASHINGTON — Commodity Credit Corp., Washington, has been awarded contract by Defense Plant Corp. to construct and equip plant in Kentucky. Cost estimated at $350,000.

### MARYLAND

BALTIMORE—Defense Plant Corp. has contract with Davison Chemical Co., Curtis Bay, Md., to provide plant facilities in Maryland at cost of over $100,000.

### TENNESSEE

LEWISBURG, TENN.—Defense Plant Corp. has let contract to Marshall Stove Co. to provide for building installations, equipment and machinery for plant in Tennessee. Cost over $400,000.

### NORTH CAROLINA

GREENSBORO, N. C.—Morton Chemical Co., 2110 High Point road, has acquired the seven acres where it is now located and will expand. Ten storage tanks for raw material, ranging in capacity from 5500 gallons to 15,000 gallons each, will be installed, in addition to other equipment.

### LOUISIANA

LAFAYETTE, LA.—Dallas Egg Drying Co., Lafayette, will spend $80,000 for dehydration plant.

OAK POINT, LA. — Bechtel-McCone-Parsons Corp., 601 West Fifth street, Los Angeles, has contract for plant for California Co., 1818 Canal building, New Orleans, to manufacture additives for diesel engine and heavy duty motor lubricating oil at Oak Point. Cost $700,000. Equipment includes mixers, tanks, pumps, piping and utilities.

### WEST VIRGINIA

SOUTH CHARLESTON, W. VA.—Bids are being taken for alterations to manufacturing plant at Naval Ordnance Plant. Owner, United States government, Navy Department, Ordnance Bureau, Washington. Lessee, Carnegie-Illinois Steel Corp., Carnegie building, Pittsburgh.

### VIRGINIA

RICHMOND, VA.—Defense Plant Corp. increased its contract with Reynolds Inc., Richmond, for additional plant facilities in Alabama, to cost in excess of $2,900,000.

### MISSOURI

ST. LOUIS—Nooter Boiler Works, 1400 South Grand street, has acquired property at northeast corner of Kosciusko and Miller streets for possible expansion.

ST. LOUIS—Woermann Construction Co., 3800 West Pine boulevard, is low bidder for factory at north side of Chestnut street between Eighteenth and Nineteenth streets. William B. Ittner Inc., 408 Board of Education building, architect.

ST. LOUIS—Sterling Aluminum Products Inc., 2925 North Market street, has acquired additional site in vicinity of plant for future expansion.

### WISCONSIN

KENOSHA, WIS.—Lunberg Bros. Machine Co. has given general contract to Joseph Zuidweg for one-story addition to tool and die shop.

MILWAUKEE—A. O. Smith Corp. has given contract to Siesel Construction Co., 514 East Ogden avenue, for four-story factory addition, to cost about $550,000. Tullgren, Grassold & Johnson, 734 North Jefferson, architects.

WEST ALLIS, WIS.—Wisconsin Motor Corp. has given general contract to Klug & Smith Co., 111 East Wisconsin avenue, for one-story addition to assembly building.

### MINNESOTA

MINNEAPOLIS—Penn-Greg Mfg. Co., 23 South Fourth street, is in the market for machine tools, lathes, milling machines, shapers, grinders, etc.

MINNEAPOLIS—Foley Mfg. Co., manufacturer of saw filing, grinding machinery, etc., has given general contract to Arvid Nestor, 2933 Central avenue, for one-story factory addition at 12 Northeast Second street.

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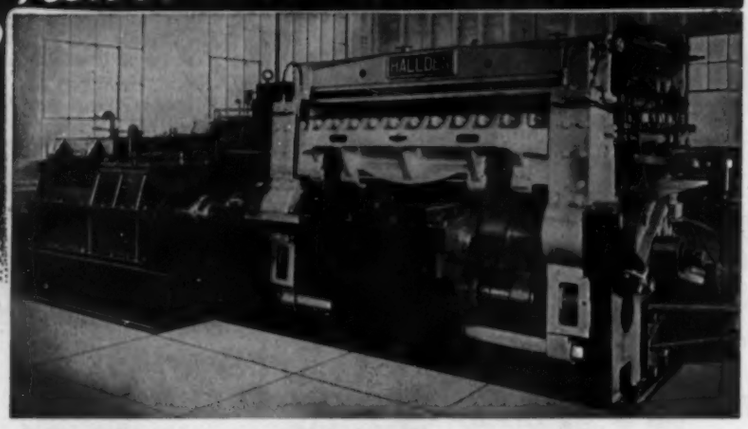

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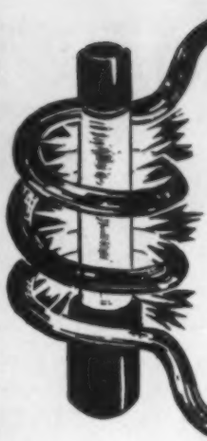

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Railway Co., Lucian C. Sprague, president, plans expenditure of $1,000,000 for improvements to facilities in Minneapolis, including shops, storage and handling space, and $800,000 for improvements to facilities along line.

ST. PAUL—Paul Pufahl & Son Foundry Co. has begun construction of one-story foundry addition at 2545 West Como avenue.

ST. PAUL—E. B. Sewall Mfg. Co. has given contract to Peter Kammerer, 1398 Charles avenue, for one-story factory addition.

ST. PAUL—Aluminum Co. of America will take over and operate the American Radiator Co. plant at 692 North Prior avenue. Plant will be remodeled for manufacture of aluminum and possibly magnesium castings.

### TEXAS

DALLAS, TEX.—Mid-City Realty Co., P.O. Box 598, plans addition to factory building, and unit remodeling. Cost $150,000.

LUFKIN, TEX.—B. L. Zeagler Lumber Co. is reconstructing sawmill at cost of $75,000.

### KANSAS

WICHITA, KANS.—Davis Westholt Aircraft Products Co. plans construction of one-story factory addition.

### IOWA

ALBERT CITY, IOWA—Superior Mfg. Co., Ed. Sundholm, proprietor, plans to rebuild plant recently destroyed by fire.

CEDAR RAPIDS, IOWA—Universal Engineering Co., until recently named Universal Crusher Co., has plans for immediate construction of an assembly plant addition to cost about $50,000.

MARSHALLTOWN, IOWA — Marshalltown Mfg. Co. has begun erection of one-story factory to be used for manufacture of aviation instruments.

TAMA, IOWA—Iowa Wood Preserving Co. has begun erection of boiler house and cylinder plant. Other buildings to be constructed include an engine house, shop building and laboratory building.

### CALIFORNIA

BURBANK, CALIF.—Contract has been awarded for assembly hangar building No. 223-A here for Lockheed Aircraft Corp., to cost approximately $35,000.

REDONDO BEACH, CALIF.—Hufford Machine Works Inc. has been organized with $25,000 capital, by L. C. Hufford, Redondo Beach; J. A. Helget, Los Angeles, and L. R. Grey, Manhattan Beach, Calif. The new corporation is represented by William E. MacFaden, 106 Emerald street, Redondo Beach.

SAN PEDRO, CALIF.—Building permit has been issued for butane fractionating towers at the Union Oil Co. refinery at 1501 Wilmington-San Pedro road, to cost $119,000.

SAN PEDRO, CALIF.—Building permit has been issued for machine shop at berth 77, San Pedro harbor, for Standard Shipbuilding Corp.

### CANADA

ETOBICOKE, ONT.—Aluminum Co. of Canada Ltd., 158 Sterling road, Toronto, has extended general contract with A. W. Robertson Ltd., 57 Bloor street West, Toronto, to include construction of new wing to plant here and office building, to cost about $75,000. Plans prepared by J. C. Meadowcraft, 1154 Beaver Hall Hill, Montreal.

HAMILTON, ONT.—Dominion Foundries & Steel Ltd., Depew street, has bids and will let contracts soon for $60,000 addition to Homer street plant. Plans by C. D. Howe Co. Ltd., Pigott building.

MERRITTON, ONT.—Alliance Paper Mills, Merritton street, has plans and will let contracts for addition to plant here to cost about $15,000.

OTTAWA, ONT.—Ontario Hughes Owens Co. Ltd., 529 Sussex street, has begun work on plant addition at 3 Hamilton avenue to cost about $75,000 with equipment. Ross Meagher Ltd., 7 Echo drive, has general contract.

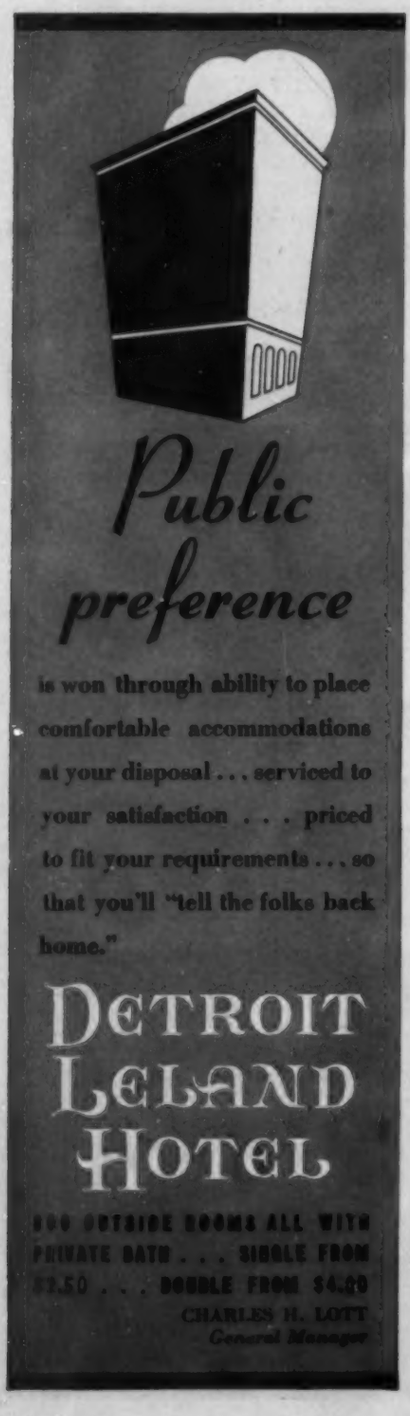
TORONTO, ONT.—Dunlop Tire & Rubber Goods Co. Ltd., 870 Queen street East, has plans for plant addition and installation of equipment, to cost about $15,000.

TORONTO, ONT.—DeHavilland Aircraft of Canada Ltd., Sheppard avenue and Dufferin street, has plans by David Shepherd, engineer, 57 Bloor street West, for plant additions to cost about $110,000 with equipment. Harry H. Angus, 1221 Bay street, is mechanical engineer, and Edgar A. Cross, 989 Bay street, structural engineer.

WINDSOR, ONT.—Ford Motor Co. of Canada Ltd., Sandwich street East, has had plans prepared and will let contracts for plant improvements and installation of electrical and other equipment to cost approximately $200,000.

LONGUEUIL, QUE.—Dominion Engineering Works Ltd., First avenue, is having plans prepared for further plant addition here, estimated to cost about $75,000.

MONTREAL, QUE.—Dominion Tar & Chemical Co. Ltd., 3547 Allard street, has plans and will call bids soon for plant addition to cost about $35,000 with equipment.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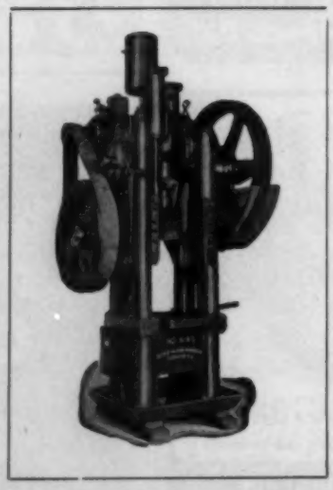

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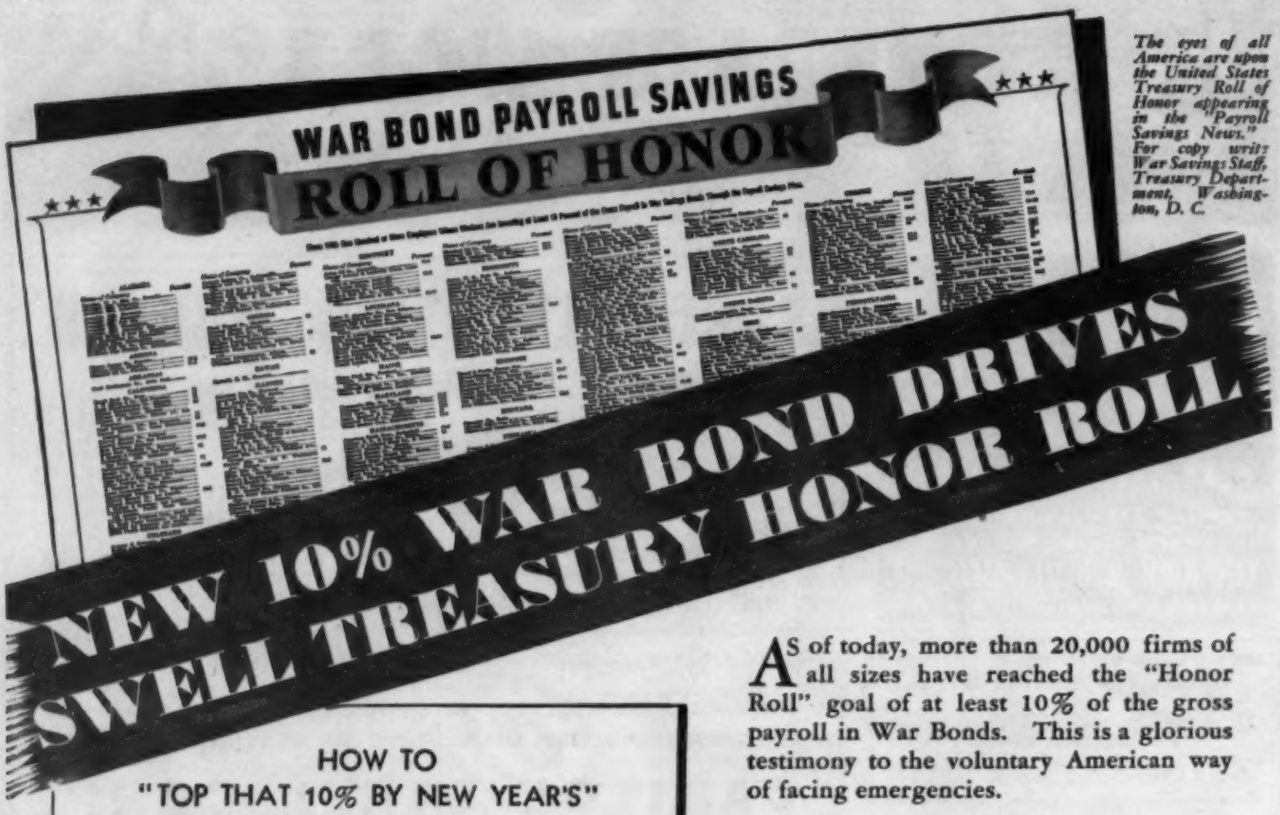


*The eyes of all America are upon the United States Treasury Roll of Honor appearing in the "Payroll Savings News." For copy write War Savings Staff, Treasury Department, Washington, D. C.*

## HOW TO "TOP THAT 10% BY NEW YEAR'S"

Out of the 13 labor-management conferences sponsored by the National Committee for Payroll Savings and conducted by the Treasury Department throughout the Nation has come this formula for reaching the 10% of gross payroll War Bond objective:

1. ***Decide to get 10%.***
   It has been the Treasury experience wherever management and labor have gotten together and decided the job could be done, the job was done.
2. ***Get a committee of labor and management to work out details for solicitation.***
   a. They, in turn, will appoint captain-leaders or chairmen who will be responsible for actual solicitation of no more than 10 workers.
   b. A card should be prepared for each and every worker with his name on it.
   c. An estimate should be made of the possible amount each worker can set aside so that an "over-all" of 10% is achieved. Some may not be able to set aside 10%, others can save more.
3. ***Set aside a date to start the drive.***
4. ***There should be little or no time between the announcement of the drive and the drive itself.***
   The drive should last not over 1 week.
5. The opening of the drive may be through a talk, a rally, or just a plain announcement in each department.
6. Schedule competition between departments; show progress charts daily.
7. Set as a goal the Treasury flag with a "T."

AS of today, more than 20,000 firms of all sizes have reached the "Honor Roll" goal of at least 10% of the gross payroll in War Bonds. This is a glorious testimony to the voluntary American way of facing emergencies.

But there is still more to be done. By January 1st, 1943, the Treasury hopes to raise participation from the present total of around 20,000,000 employees investing an average of 8% of earnings to over 30,000,000 investing an average of at least 10% of earnings in War Bonds.

You are urged to set your own sights accordingly and to do all in your power to start the new year on the Roll of Honor, to give War Bonds for bonuses, and to purchase up to the limit, both personally and as a company, of Series F and G Bonds. (Remember that the new limitation of purchases of F and G Bonds in any one calendar year has been increased from $50,000 to $100,000.)

*TIME IS SHORT.* Our country is counting on you to—

## "TOP THAT 10% BY NEW YEAR'S"

*Save with*

# War Savings Bonds

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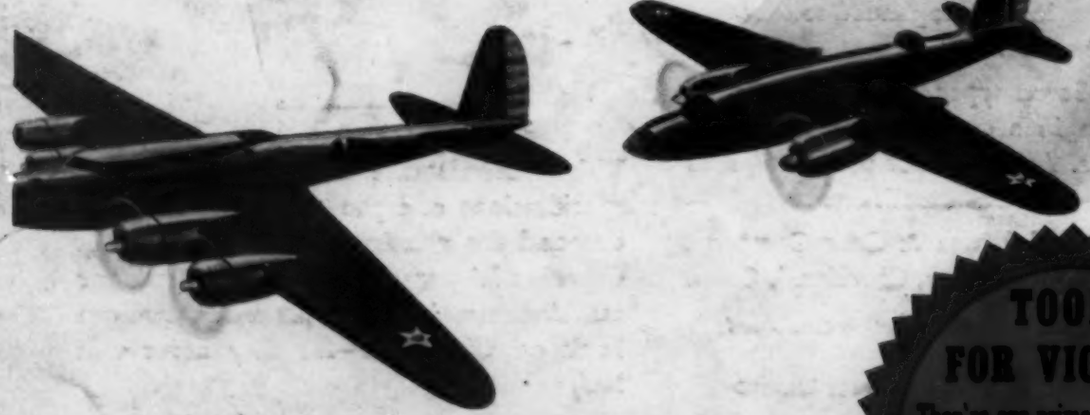

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